



FRIDAY, MARCH 4.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Elections.—Camden & Atlantic, George B. Roberts, President.—Central, of Georgia, M. S. Belknap, General Manager.—Cleveland, Columbus, Cincinnati and Indianapolis, James D. Layng, President.—Cleveland, Akron & Columbus, James Harrington, Chief Engineer.—Connecticut Railroad Commission, William O. Seymour.—Detroit, Charlevoix & Escanaba, R. M. Cherie, President; Arthur A. Bleasby, Vice-President.—Frederick & Pennsylvania Line, Charles E. Trail, President; John S. Leib, Treasurer; Stephen White, Secretary.—Flagstaff & Grand Cañon, John S. Norris, President; D. M. Riordan, Treasurer.—Housatonic, W. H. Barnum, President; C. K. Averill, Secretary.—Hancock & Calumet, H. C. Ives, President; Christopher Meyer, Vice-President.—Lake Erie & Western, William A. Wildhack, Auditor.—Lehigh & Wilkesbarre Coal Co., Mr. William H. Tillinghast, President.—Memphis, Trinidad & Pueblo, M. L. Brown, President; George Stone, Vice-President.—Norfolk & Western, William G. McDowell, Treasurer.—Northern Central, Geo. B. Roberts, President; Frank Thompson, Vice-President.—Savannah, Florida & Western, James B. Plant, President; W. S. Chisolm, Vice-President; H. S. Haines, General Manager.—New York Railroad Commission, James Arkell, Commissioner.

Personal.—Died, John Jarvis Sanborn.—Died, Charles W. Rogers.—Mr. E. Holbrook, Division Superintendent of New York & New England, resigns.—Stacey B. Opyke resigns the Superintendship of the New Haven & Northampton.

Earnings.—For Jan. 31, 27 roads report gross earnings, all but one reporting increase for the month.

Traffic.—Anthracite coal shipments for week ending Feb. 26, show increase of 10.4 per cent. over corresponding period last year; bituminous shows increase of 8.7 per cent.; coke, for week ending Feb. 19, shows increase of 238.6 per cent.—Cotton receipts, interior markets, for week ending Feb. 25, show a decrease of 13.5 per cent. as compared with corresponding period last year; shipments show increase of 14.2 per cent.; seaports receipts show increase of 2.3 per cent.; exports a decrease of 10.8 per cent. Cotton in sight is less than at same date last year by 20.6 per cent.

Changes and Extensions.—Alabama: Birmingham, Georgia & Florida will build this year from Birmingham to Tallahassee, Fla.—California: Southern Pacific will build short spur in Los Angeles county; South Pacific Coast will extend line southward from Los Alamos, Cal.—Connecticut: New York & Boston Rapid Transit Co. is said to be surveying for the proposed New York and Boston air line.—Dakota and Montana: St. Paul, Minneapolis & Manitoba will build 700 miles of road.—Georgia: Atlantic, Greenville & Western is graded for 80 miles.—Louisiana: Vicksburg, Shreveport & Pacific, raising of roadbed completed.—Massachusetts: Central Massachusetts is being graded between Barre Plains and Ware.—Mexico: Mexican National will build into Guadalajara.—Missouri: Chicago, Fort Scott & Texas extends survey.—Mississippi: Ship Island, Ripley & Kentucky graded 36 miles from Ripley.—New Jersey: West Jersey road will extend Bridgeton branch 1½ miles; New Jersey will build branch from Manumuskine to Port Norris.—Ohio and Pennsylvania: Lake Shore & Michigan Southern will build branch from Sharon to Sharpesville.—Ohio: Cleveland, Akron & Ohio extends Dresden Branch.—Pennsylvania: Survey for new road from Bethlehem to Nazareth.—Tennessee: Nashville, Chattanooga & Tennessee surveys new branch.—Texas: Dallas & Waco locates survey; Southern Pacific removes tracks from Indianola to Port Lavaca.—Virginia: Virginia Western begins survey from Catawba, Roanoke County.—Wisconsin: The Merrill extension of the Chicago, Milwaukee & St. Paul is to be proceeded with at once.

Leases and Sales.—Des Moines, Osceola & Southern is sold under mortgage.—Hartford & Connecticut Western will be controlled by Philadelphia parties.—Little Rock, Mississippi River & Texas is transferred to the St. Louis, Iron Mountain & Southern.—New York, Lake Erie & Western leases the Wabash, St. Louis & Pacific's line of steamers on Lake Erie.—New York, Woodhaven & Rockaway Beach passes to the control of Austin Corbin.—Wabash, St. Louis & Pacific Purchasing Committee makes payment of \$1,000,000.

Foreclosures and Reorganizations.—Hancock & Calumet reorganized and controlled by the Mineral Range.—Philadelphia & Reading reorganization trustees receive reports of stocks and securities deposited, which amount to \$109,252,646.—Texas & Pacific reorganization committee effects a settlement with the income bondholders.

New Companies Organized.—Amoret & Southwestern, charter filed at Topeka, Kan.—Florence & Chicago organized in Alabama.—Flagstaff & Grand Cañon organized in Arizona.—Hastings, St. Paul & Cannon Falls organized in Minnesota.—Jeanerette & Abbeville organized in Louisiana.—Memphis, Trinidad & Pueblo chartered in Kansas.—Moosic Mountain & Carbondale obtains charter in Pennsylvania.—Mississippi River incorporated in Missouri.—Northern Pacific & Atlantic incorporated at Albany, N. Y.—

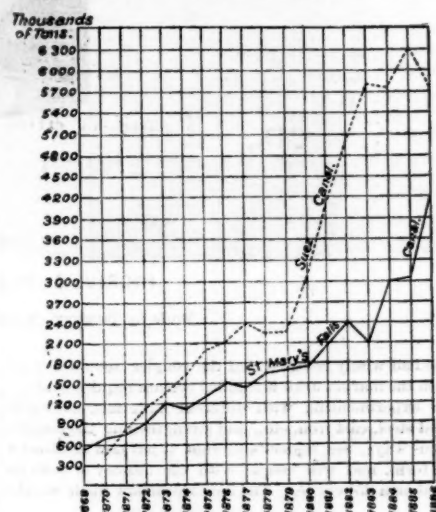
Omaha & Southwestern chartered in Kansas.—Roadhouse & Quincy incorporated in Illinois.—Yankton, Sioux Falls & Nebraska organized in Dakota.—Alpena & Petosky, incorporated in Michigan.

Reports and Financial.—Albany & Susquehanna for quarter ending Dec. 31 shows gain of 0.9 per cent. gross and loss of 18.8 per cent. net.—Buffalo, New York & Philadelphia for quarter ending Dec. 31, shows loss of 3.8 per cent. gross and 77.3 per cent. net.—Chicago, St. Paul, Minneapolis & Manitoba for year ending Dec. 31 shows gain of 5.8 per cent. gross and 10.0 per cent. net.—Chicago & Alton for year ending Dec. 31 shows gain of 0.8 per cent. gross and 0.8 per cent. net.—Lake Shore & Michigan Southern for year ending Dec. 31 shows gain of 12.2 per cent. gross and 33.8 per cent. net.—Mexican National for quarter ending Dec. 31 shows gain of 26.8 per cent. gross and 93.8 per cent. net.—Nashville, Chattanooga & St. Louis, for 6 months ending Dec. 31, shows gain of 19.2 per cent. gross and 23.5 per cent. net.—New York, Lake Erie & Western, for 4 months ending Jan. 31, shows gain of 8.5 per cent. gross and 5.8 per cent. net.—New York & New England, for quarter ending Dec. 31, shows gain of 9.6 per cent. gross and 3.0 per cent. net.—New York, Ontario & Western, for quarter ending Dec. 31, shows loss of 32 per cent. gross and 42.2 per cent. net.

Miscellaneous.—Canadian Pacific's new steamship line will start from Vancouver, W. T.—Columbia & Port Deposit re-opens traffic after a month's suspension.—Delaware, Lakawana & Western will erect a very large coal trestle near East Buffalo, N. Y.—It is proposed to build a very large union station in Boston for the use of 4 roads.—Manhattan Elevated will have an elevator at the 116th street station.—New road is to be built from Anniston, Ala., to Columbus, Ga.—New Orleans, Vicksburg & Baton Rouge stockholders sue the American Improvement Co. and others to recover \$6,720,000.—Pullman's Palace Car Co. wins suit in Louisiana.

The Saint Mary's Falls Canal.

The War Department has published Lieut.-Colonel O. M. Poe's estimate for a new and larger lock, demanded by the rapidly growing traffic between Lake Superior and the lower



lake ports. The proposition is to build a lock 100 feet wide 800 long, with 21 feet on the mitre sill and a lift of 18 feet.

This is designed to accommodate vessels of 20 feet draft, and if the tonnage increases in register in the same ratio, in which it has increased from the original draft on the lakes of 9 feet, to 16, the present limiting depth, the proposed lock will pass vessels of about 5,000 tons carrying capacity, 2,800 to 3,000 tons being the present maximum.

The original canal, built under a State charter, had two locks of 9 feet lift each, and were 70 feet wide, 350 long with 11½ feet on their mitre sills. The work was commenced June 4, 1853, and the first boat passed June 18, 1855. The entire cost was \$999,202.46.

When the government took control of the canal it was decided to build the present lock, with a single lift of 18 ft., 80 ft. wide, 515 long and 17 ft. on the mitre sill. The first contract was let Oct. 20, 1870, and the first boat passed Sept. 1, 1881. The cost was \$2,405,000, of which \$255,000 was expended in improving the St. Mary's River.

The celerity with which the commerce of the Lakes availed itself of this increased capacity can be seen from the fact that in 1883 only 11 per cent. of the tonnage passing through the canal could have been passed by the old locks.

The estimated cost of the proposed lock is \$4,738,865, in which the rather elastic items of "engineering and office expenses" figure for \$300,000, and "contingencies" are set down at 25 per cent. of the whole, \$947,773. It is assumed that the construction will occupy 10 years, and there is no charge for interest. The new lock could undoubtedly be constructed within three years from the time of commencement, instead of requiring 10 years as estimated, and if we assume interest at 4 per cent. on expenditures uniformly distributed in each case, the costs at completion would be \$4,936,375 and \$5,689,912. If the saving on the items "engineering" and "contingencies" is taken into account, the difference in costs will not be less than \$1,000,000. This waste of money will be due to Congressmen and others (who

have, or think they have, an ignorant constituency) objecting to judicious expenditures that tend to develop the carrying trade of the country.

The amounts of tonnage passing through the canal and number of vessels for each year since its opening, and for purposes of comparison the same figures for the Suez Canal, are given:

Traffic on the St. Mary's Falls and Suez Canals.

Year	St. Mary's Falls Canal		Suez Canal	
	No. of vessels.	Registered tonnage.	No. of vessels.	Net tonnage
1855	106,296	106,296	106,296	106,296
1856	101,458	101,458	101,458	101,458
1857	180,820	180,820	180,820	180,820
1858	219,819	219,819	219,819	219,819
1859	352,842	352,842	352,842	352,842
1860	403,657	403,657	403,657	403,657
1861	276,039	276,039	276,039	276,039
1862	359,612	359,612	359,612	359,612
1863	507,434	507,434	507,434	507,434
1864	571,438	571,438	571,438	571,438
1865	997	409,062	997	409,062
1866	1,008	458,530	1,008	458,530
1867	1,305	550,899	1,305	550,899
1868	1,155	432,563	1,155	432,563
1869	1,338	524,885	1,338	524,885
1870	1,828	690,826	1,828	690,826
1871	1,037	752,101	1,037	752,101
1872	2,004	914,735	2,004	914,735
1873	2,517	1,204,446	2,517	1,204,446
1874	1,734	1,070,857	1,734	1,070,857
1875	2,093	1,259,534	2,093	1,259,534
1876	2,457	1,541,678	2,457	1,541,678
1877	2,451	1,429,216	2,451	1,429,216
1878	2,567	1,667,138	2,567	1,667,138
1879	2,321	1,677,071	2,321	1,677,071
1880	3,503	1,734,800	3,503	1,734,800
1881	4,004	2,092,757	4,004	2,092,757
1882	4,774	2,408,088	4,774	2,408,088
1883	4,315	2,442,250	4,315	2,442,250
1884	5,698	2,997,834	5,698	2,997,834
1885	5,380	3,035,937	5,380	3,035,937
1886	7,424	4,219,397	7,424	4,219,397

The canal has been open on an average 212 days, or 7 months each year, so that for the time it is open it has a larger traffic than the Suez Canal, which, however, does not, as above, include the traffic of boats of 4 to 7 tons each, which amounted in 1884 to 6,433 tons, and in 1886 to 15,187 tons.

The difference between net and registered tonnage should also be noted. Net tonnage on the Suez Canal means, as for some time has been customary, except in vessels of American registry, the gross tonnage of a vessel, less a maximum allowance in the case of sailing vessels of 5 per cent. for space occupied by crew, and in the case of steamers a further allowance, which shall not exceed 50 per cent. of the gross tonnage for machinery and coal, with an additional possible allowance of about 15 tons for officers' accommodations.

The United States registered tonnage was the gross tonnage of the vessel, but the act of August 5, 1852, puts our shipping on a par with that of other countries by admitting the same allowances as given in the case of the Suez Canal, except there is no allowance for officers' quarters and accommodations, and it is no longer possible that an American built steamer can be tied to a New York dock, or any other dock, under a foreign flag for 45 per cent. of what it would cost if it remained under the American flag. It is impossible to estimate the allowance that should be made for this difference in the modes of measurement as no account of the actual freight carried was kept till 1881. In that year it was nearly 75 per cent. of the registered tonnage; for and since 1883 the actual freight has averaged, for sail and steam, 105 per cent. of the registered tonnage.

The principal items of freight are given below as showing not only the rapid development of the region, but also the lines on which it has advanced.

Year	Flour and grain, bushels.	Manufactured iron, tons.	Iron ore, tons.	Copper, tons.	Coal, tons.
1855	5,345	1,040	1,447	3,196	1,414
1856	122,338	781	11,597	5,727	3,698
1857	105,100	1,325	23,184	5,760	6,378
1858	79,910	2,997	31,035	6,744	4,118
1859	169,303	5,504	65,760	7,247	8,894
1860	384,687	.....	120,000	9,000	.....
1861	198,545	4,194	44,836	7,654	11,507
1862	145,517	6,438	113,014	6,881	11,346
1863	238,355	6,681	181,567	1,044	7,805
1864	313,245	7,643	213,753	5,531	11,282
1865	307,941	7,346	147,459	9,935	10,915
1866	435,756	20,602	222,861	10,585	22,927
1867	421,983	22,785	191,939	12,222	25,814
1868	483,536	23,851	239,368	18,602	27,850
1869	521,517	42,939	409,950	11,301	16,952
1870	1,815,828	54,984	327,461	14,562	46,798
1871	1,694,963	86,194	363,105	14,591	80,815
1872	2,293,102	44,920	504,121	15,927	96,780
1873	2,019,290	31,741	427,655	15,346	61,123
1874	3,013,823	54,381	493,408	18,396	101,260
1875	4,270,765	64,091	609,762	25,756	124,734
1876	3,468,865	30,791	568,082	16,767	91,575
1877	3,860,606	14,882	555,750	22,529	91,856
1878	5,810,162	39,218	540,075	22,400	110,704
1879	7,317,326	46,791	677,073	21,753	170,501
1880	8,832,068	67,430	748,131	20,488	295,647
1881	9,922,205	92,870	987,070	25,400	430,184
1882	10,112,160	109,910	791,732	31,024	714,444
1883	18,744,109	72,428	1,136,071	38,062	706,397
1884	22,897,659	60,842	1,235,132	31,927	891,991
1885	28,503,693	115,208	2,087,809	38,627	1,009,999

The passenger business has increased very steadily from a little over 4,000 to an average for the last five years of 37,000. Salt has averaged 137,470 bbls. for the last five years, and lumber 111,900 M. Since 1870 about 23,000 tons of silver and bullion and 72,000 tons of building stone have passed through the canal.

The iron ore trade has, as is shown above, been the principal source of traffic to the canal. The output of the Lake Superior mines, since the opening of the Menominee mines, is given below.

Year	Marquette, tons.	Menominee, tons.	Gogebic, tons.	Vermilion, tons.	Total, tons.
1877	1,010,404	4,593	.....	.....	1,015,007
1878	1,035,082	78,028	.....	.....	1,113,110
1879	1,130,019	238,874	.....	.....	1,368,893
1880	1,377,622	497,003	.....	.....	1,874,625
1881	1,589,832	715,815	.....	.....	2,305,647
1882	1,831,474	1,196,021	.....	.....	3,027,495
1883	1,293,357	1,050,934	.....	.....	2,344,291
1884	1,558,235	865,634	1,023	62,124	2,517,013
1885	1,430,492	680,435	110,768	225,484	2,446,107
1886	1,600,118	872,201	756,381	304,393	3,541,096

All of the Menominee and a large part of the Marquette ore goes to market by Escanaba.

If the output of the Vermilion and Gogebic mines for this year is as large as predicted, it is probable that nothing but a scarcity of shipping will prevent the traffic of the canal reaching 5½ million tons.

The canal was open last year 224 days, and the number of lockages was 3,573, or 16 per day on the average. The greatest number of vessels passing in one day was 67.

Hydraulic Riveting Machine.

One of the numerous mechanical operations to which the use of hydraulic pressure is exceedingly well adapted is that of driving rivets in boilers, bridges, ship plates and other wrought-iron work. The intense pressures required are easily obtained and controlled, while the moving parts through which they are applied are so compact as to allow the greatest possible freedom in the position and movement of the work.

The hydraulic riveting machine illustrated by the accompanying engraving is built by Messrs. Bement, Miles & Co., Philadelphia.

The design and manner of connecting the frame and stake was originated and introduced by this firm some fifteen years ago in the construction of steam riveting machines, and has been in constant use by them up to the present time. The stake may be either a steel casting or a steel or iron forging, secured to the frame by two heavy iron bolts below the opening. This arrangement permits the use of a stake of the best form, not only for strength, but for the easiest access to work of all shapes. An auxiliary stake is often added for work of small diameters.

The forward and backward movements of the movable die are produced in the same cylinder; a narrow, annular space around the piston proper being utilized for packing.

The machine can be furnished either with its cylinder central, as shown, or, if required, with the top flush and nearly level with the dies. The joint between the cylinder and frame does not require to be water tight; the surfaces are simply faced and bolted together. The connection between the piston and the rectangular riveting slide is such that no accuracy is needed in adjusting the cylinder to its place, merely putting the loosely fitting bolts through their holes being all that is required.

Cupped leather packings are used, as being the most efficient and compact. They can be quickly replaced when required, and are, when properly made and used, very durable. The leather for the packings should be of the best quality, of uniform texture throughout, and shaved to the thickness required by the formers which are furnished with the machine. After the blank is cut, it should be just moistened with water and then placed for a while in tallow which is only warm enough to be melted. The former should be made about as warm as it can conveniently be held in the hand, drawn down upon the leather very slowly until thoroughly tight, and left for a day or two if possible. Before it is loosened, the outer edge of the packing should be neatly trimmed, flush with the face of the former, and will then be a guide by which to trim the other edge after being taken out. An important point in the machine illustrated is, that all the surfaces in contact with these packings are of brass or copper, which greatly increases the durability of the leather, as well as that of the machine itself.

The valves are of the simplest form, and are controlled by the movement of one lever, and can be used a long time without repairs if care is taken to keep the water, or other liquid used, entirely clean. If a tank is used, it should be well covered and occasionally cleaned, and the water should pass into it through an efficient strainer. Layers of flannel, say 12 by 6 inches, or more, and piled to 3 or 4 inches in thickness, held in a suitable box with perforated bottom, will perhaps be found as simple and effective as anything.

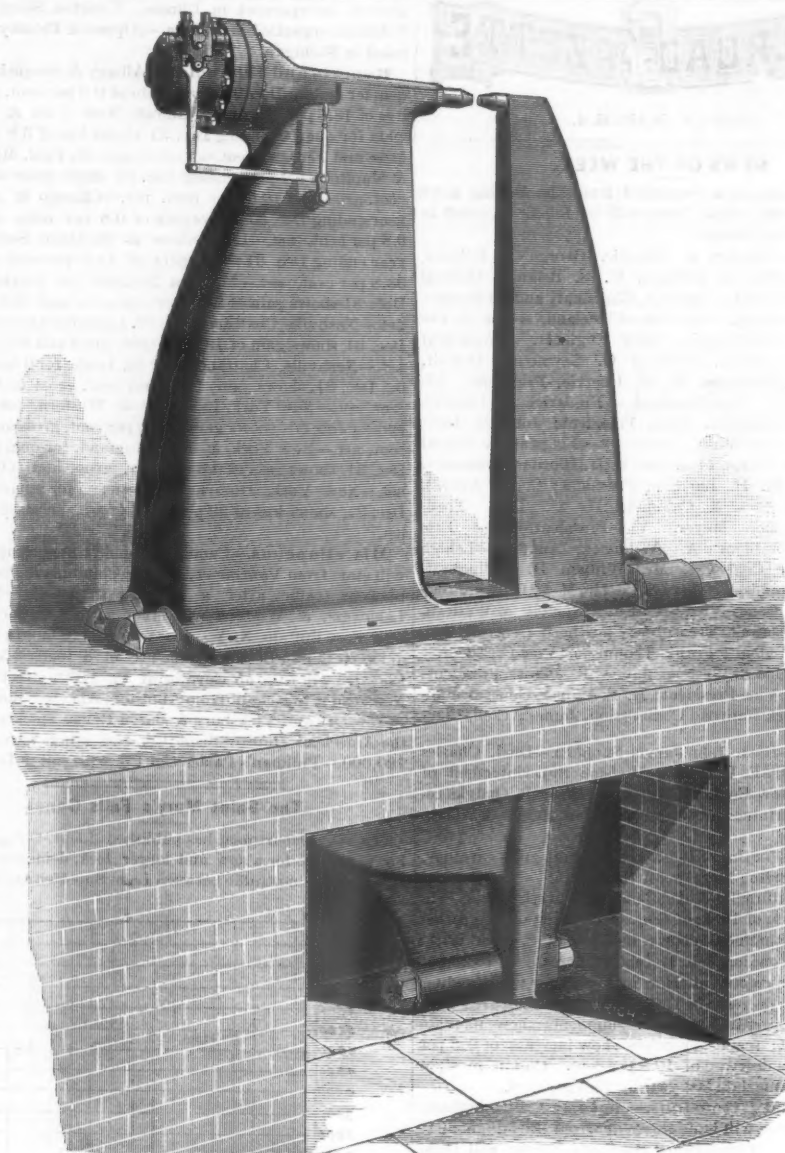
The pressures used in the hydraulic machinery of different establishments vary considerably, ranging from 1,000 lbs. per sq. in. to 3,000 lbs. or more; so that, when it is desired to add a riveting machine to a plant already in use, the cylinder must be made of such diameter as the case requires.

Boiler makers differ materially in opinion as to the force which should be used in driving rivets of the various sizes, owing largely, perhaps, to prejudice or differing experiences, but also, no doubt, on account of the great differences prevailing in the proportionate diameters of heads used for rivets of the same diameter. In dies ordered, for example, for ¾ in. rivets, the diameters of heads have ranged from 1⅜ to 1½ in. The former could be driven by about two-thirds the force required for the latter. It is impossible, therefore, to state exactly the capacity of a machine to drive rivets of a given size without also specifying correctly the diameter of the heads. The machine we are describing is capable of using a total pressure of 140,000 lbs., and of driving a rivet 8 ft. from the nearest edge of the sheet. The stroke is adjustable in length, economizing water when the full length of movement is not required.

The liquid ordinarily used is water, to which is often added about 15 per cent. of glycerine to prevent freezing.

The Dowling Car Coupler.

Some little surprise has been expressed in several quarters at the backwardness in coming forward of this vertical plane coupler, of which great things were expected. The Committee of the Master Car-Builders' Association arranged that the coupler should be tried on the Rock Island road, but though that line at once provided the cars, they remained unequipped with the Dowling coupler. The delay naturally caused some comment, but appears to have been caused by a long series of experiments made on the coupler by the own-



HYDRAULIC RIVETING MACHINE.

Made by BEMENT, MILES & CO., Philadelphia.

ers, who had wisely resolved that the coupler should not be put upon the market until it fulfilled certain requirements.

After experimenting with different materials, malleable iron, cast steel, cast iron, etc., and strengthening the coupler in various ways, we understand that it has now assumed a definite form, and will couple with the Janney or with its own kind on a 25° curve. The knuckle as now made weighs

6 in., and 12 ft., and will finally break with a fifth blow with 16 ft. 6 in. fall.

The pin is now raised and the head opened by means of a chain, and it is claimed that the coupler can be very easily manipulated. The practical trials of the coupler will now be awaited with considerable interest.

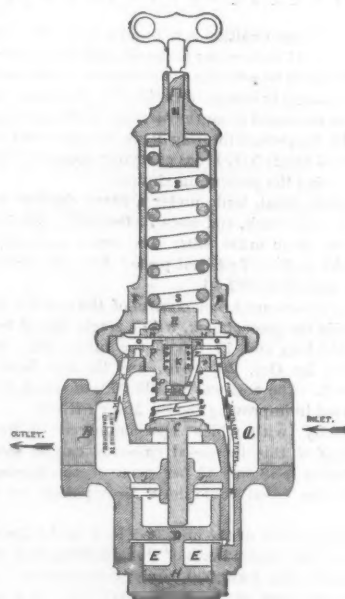
It is undoubtedly a good plan to test new couplers with a falling weight, and, if more extensively pursued, would save a great deal of trouble on the road. Unfortunately, most inventors have a tender feeling towards their bantlings, and wish to handle them gently, and, therefore, omit the Spartan education which is calculated to develop the robust coupler.

The Mason Reducing Valve.

The engraving represents a form of reducing valve manufactured by the Mason Regulator Co. of Boston.

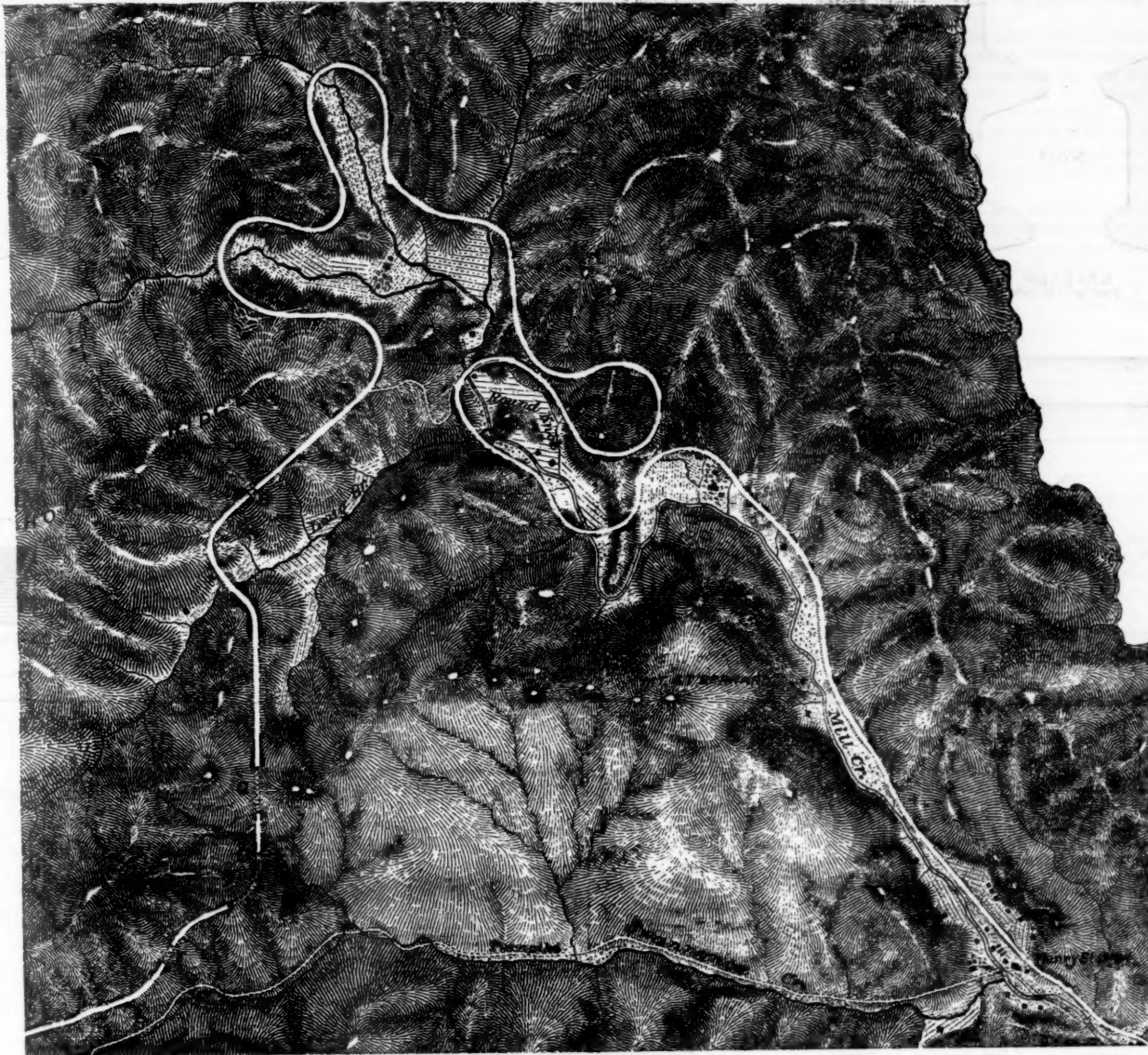
The principle upon which the Mason reducing valve is made is that of an auxiliary valve, controlled by the low pressure, and which admits steam from the high pressure side to operate a differential piston, which is the main valve. By referring to the sectional view, it will be seen that the high pressure enters the reducing valve at the side marked "inlet," and passing through the auxiliary valve *K*, which is held open by the tension of the spring *S*, passes down the port marked "from auxiliary to cylinder," underneath the differential piston *D*. By raising this piston *D*, the valve *C* is opened against the initial pressure, since the area of *C* is only one half of that of *D*. Steam is thus admitted to the low-pressure side, and also passes up the port *XX* underneath the phosphor-bronze diaphragm *OO*, upon which bears the spring *S*. When the low pressure in the system has risen to the required point, which is determined by the tension of the spring *S*, the diaphragm is forced upward by the steam in the chamber *OO*, the valve *K* closes, no more steam is admitted under the piston *D*, the valve *C* is forced on to its seat by the initial pressure, thus shutting off steam from the low-pressure side. This action is repeated as often as the low pressure drops below the required amount. This piston *D* is fitted with a dash-pot *E*, which prevents chattering or pounding when the high or low pressure suddenly changes.

This valve is designed to reduce and maintain an even steam or air pressure regardless of the initial pressure. It will automatically reduce boiler pressure for steam heating coils, dry rooms, etc., and all places where it is desirable to use lower pressure than that of the boiler. It is easily applied, as there are no more connections to be made than in the application of an ordinary globe valve. The dashpot,



The Mason Reducing Valve.

55 lbs. and the head 95 lbs., making a total per coupler of 150 lbs. Mild cast steel is considered the most suitable material for the knuckle. Efforts have been directed towards making the coupler without any fitting or machine work. It is claimed that the coupler has been greatly increased in strength, and will now stand a blow five-fold greater than as originally made. The coupler being placed vertically, a weight of 1,890 lbs. is let fall on the knuckle. The coupler will stand four blows with respective falls of 5 ft., 7 ft., 9 ft.



LOCATION OVER THE BLUE RIDGE—WESTERN NORTH CAROLINA RAILROAD.

which immediately fills with condensation, prevents chattering or pounding, and requires no attention. No extra lock-up attachment is needed, as the pressure is regulated by a key, which the engineer retains. The sizes up to and including 2-inch are made of composition, and above that, of cast iron, with composition linings. A special feature of the larger sizes, which engineers will appreciate, is the manner in which the composition lining is put in. Instead of being forced in, as is usually done, it is hung up in the valve, leaving a space between the iron and composition for the unequal expansion of the metals. There is no possibility of the piston sticking when the valve is heated, and the same fit which is made when cold, in the manufacture, answers when the valve is in use. The area of the passage from the high to the low pressure side of the valve is equal, when open, to the full area of the pipe, so that a low pressure of the system, almost equal to the initial high pressure, may be carried. This is an advantage when steam is first turned on, as pressure will immediately be admitted to the system. It is claimed that this valve will maintain an even steam or air pressure as low as one pound if necessary.

We understand that this valve has been used in the Hygeia Hotel at Old Point Comfort, Va., and in other places with very satisfactory results, and that it is especially applicable to any system of heating cars by steam from the locomotive.

The Star Portable Forge.

The accompanying illustration represents a form of portable forge lately introduced by the Star Machine Co., of Buffalo, N. Y.

It is claimed that this form of forge possesses several advantages in the small number of parts, the simplicity of the construction and the small amount of friction. It is, consequently, easily worked, and is little likely to get out of order.

A reference to the engraving will show that there is only one large wheel (hand-wheel) in its construction. This is driven by the rack, which is moved up and down in the guides attached to the legs of the machine, and which engages with the pinion on the clutch hanging on the same shaft (which is stationary) as the hand-wheel. The shaft is so arranged that any wear of the pinion and rack can be taken up by means of set screws. The rack receives its motion from the lever, which is hung on a swivel, thereby enabling the worker to move about on a considerable radius while working. The ease with which the machinery can be started is surprising, and is owing both to the principle and simplicity of its construction.

It is claimed that the clutch has remarkably few parts, and is so constructed that practically there is no wear.

The forge illustrated is known as No. 7 size, and is guaranteed to produce a welding heat on 3-in. round iron in six minutes, and on heavier work, if required. The fan is 10 in. diameter, and the hearth measures 24 in. by 30 in. The



The Star Portable Forge.

Made by the STAR MACHINE CO., Buffalo, N. Y.

fireplace is 32 in. high, and the weight of the forge complete is 200 lbs.

This size and style of forge is considered by the makers to be specially adapted for railroad shops.

Western North Carolina Location over the Blue Ridge.

The interesting piece of railroad location illustrated in this issue is on the mountain section of the Western North Carolina Railroad. This section crosses the Blue Ridge Mountains 18 miles east of Asheville, at a point known as Swannanoa

Gap, 2,600 feet above tide water. The part of the road shown on the accompanying cut is 10 miles in length and has an elevation of 1,190 feet, to overcome the actual distance by the old state pike was somewhat over 3 miles. The maximum curvature as first located was 10°, but for economy of time as well as money this was exceeded in a few instances as the work progressed, but is now being by degrees reduced. The maximum grades on tangents are 116 feet per mile, on curves the grade is equated one-tenth to a degree. The masonry is of the most substantial kind, granite viaducts and arch culverts. The numbers and lengths of tunnels as indicated by letters on cut are as follows:

	Ft. in all of these.
A. Point Tunnel.....	216' long.
B. Jarrett's ".....	125' "
C. Lick Log ".....	562' "
D. McElroy ".....	89' "
E. High Ridge ".....	451' "
F. Burgin ".....	262' "
G. Swannanoa ".....	1,800' "

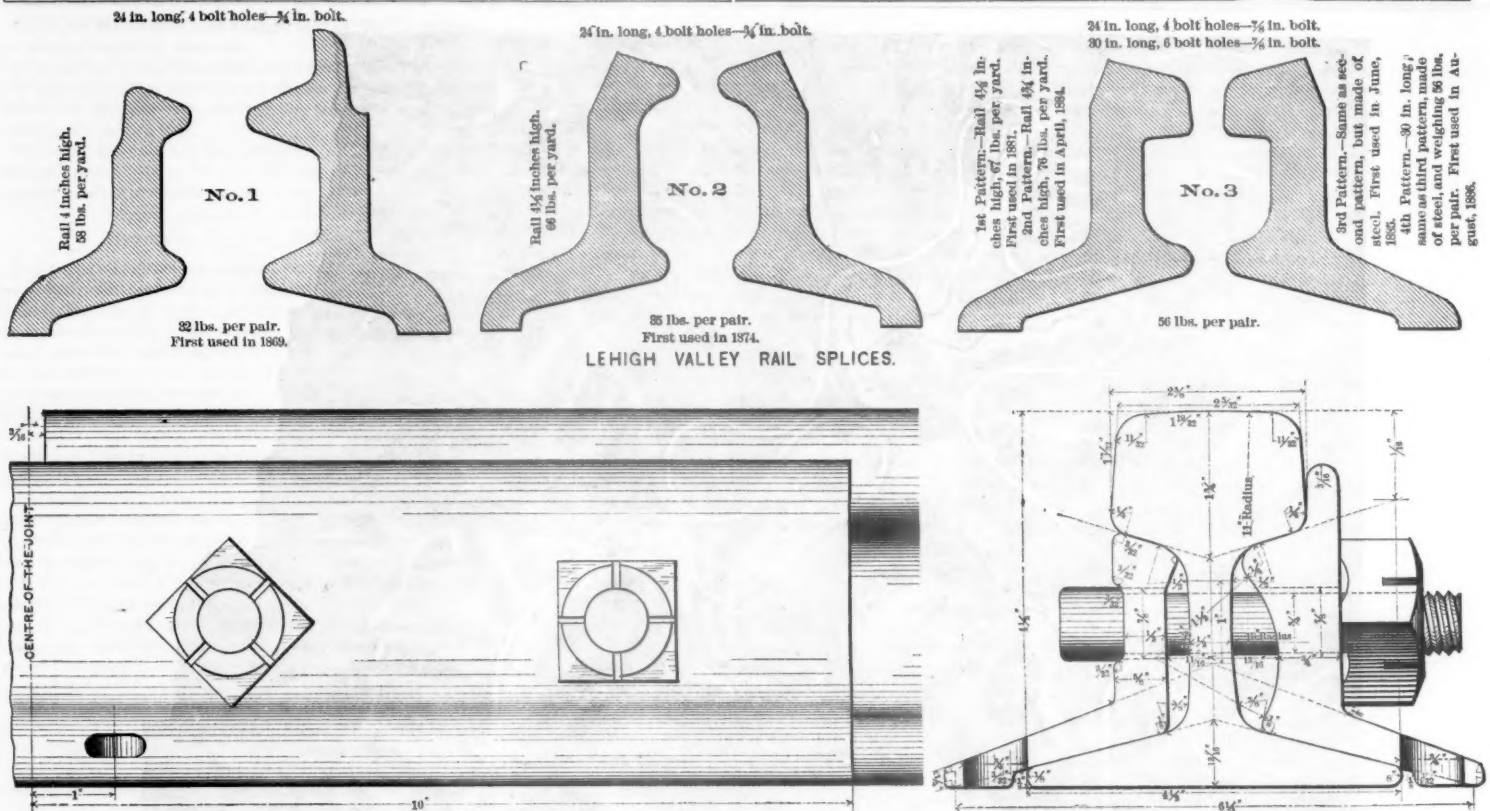
The work was done by the State of North Carolina with convict labor, under the direction of Mr. Jas. A. Wilson, as President and Chief Engineer, but was sold by the state to the Richmond & Danville system.

The Trans-Caspian Railway.

The last number of the *Fortnightly Review* has an article on this road from the pen of the well-known Asiatic traveler, A. Vambéry. The line starts from near Mikhailovsk, on the island of Usun Ada, which is from 18 to 24 hours' steaming time from Baku, and goes to Samarkand. The principal points, with their distances from Usun Ada, are as follows: Kizil Arvat, 144 miles; Ashkabad, 280 miles; Dushakh, 385 miles, "the future starting point of the Indian Railway"; Merv, 496 miles; Tchihardjui, on the left bank of the Oxus, 650 miles; Bokhara, 718 miles, and Samarkand, 885 miles. From Ashkabad, where the main road to Khiva joins the railroad, the Russians are making a caravan route to and through Northeastern Persia.

The cost of the road is given as 30,000 roubles per verst, or taking the rouble at 75 cents, \$22,500 per mile. There must have been very little bridging (the Oxus is crossed by a ferry), and not much grading, but there were two sandy deserts, one from the coast 130 miles and another between Merv and Tchihardjui of 150 miles. At first drinking water was distilled from the Caspian. "The most infernal heat" was found by Colonel Markuseff to be 55° Reaumur, or 155° F., about as bad as Death Valley, which prevented the Russians working, and on account of the shifting sands, "In order to lay the sleepers to any purpose, the Russians had first to bring up sea water to water the sand, and then to lay down clay brought from the steppes; and it was only after they had in this way formed an artificial foundation that

* For the sake of economy of space our cut omits the Point and Swannanoa tunnels (the latter is the summit tunnel), but covers all of the location which is of interest to engineers, the remainder at the Swannanoa end being almost "on tangent" to and through the summit.



they proceeded to put down the sleepers and fix the rails." If they had to haul their clay all of this distance before laying the rails, it must have been a prodigious undertaking and makes the cost of the road remarkably low.

The wages paid were, to Russians, \$1.13; to Tekke Turkomans, 22 1/2 cents, and to Bokhariots, 16 1/2 cents per day. These men were "divided into detachments and superintended by mounted officers. The workmen were summoned to work, after morning prayers, by the sound of the drum; the sound of the drum announced the times for meals and repose and, in the evening, the end of the day's work." These Turkomen, Ozbegs, Kurds and Persians flocked in from great distances, lived on rice, melons and vegetables, worked well and saved money, departing with respect for the prompt and full payments of the Russians. The number employed at one time was about 25,000.

The road has about one station to every 16 miles. Many of the stations are of wood, in some cases tents of black felt are still used for station houses. Every 8 1/2 miles a hut is built for a section gang, with a tower by its side, from which the road can be surveyed. "But in order to inspect more minutely the state of the permanent way, to try the rails and to remove obstacles, two men start daily from the barracks, going 6 versts (4 miles) in each direction up and down the line. For this purpose each barrack is provided with two horses. On their journey out one rides and the other walks; on their return journey the one who rode walks. By this clever arrangement the inspection of the vast line of railway does not require more than one hundred and ten or one hundred and twenty such guard-houses, and a by no means contemptible economy is effected." While it is rarely safe to invest much money on the strength of a technical description by a layman, it does seem as if some of our hand car builders should look after this item.

The fuel used is petroleum; a branch line, 23 miles long, running from Bala Ishem (37 miles from Usun Ada) to some naphtha springs, which are said to be as productive as those on the west side of the Caspian.

Vambéry, possibly influenced by his dislike of the Russians, "can without any circumlocution assert that merely *strategic, military and political* reasons led the Russians to the construction of this line." But it cannot be denied that the raids which have devastated Northeastern Persia are stopped and the fierce Turkoman "head-hunters" that gave such interest to his journeyings through that country are said to be irrigating and cultivating the land on the line of the road they helped to build, and Russia is not only sending large quantities of cotton seed into the country, but is following it with machinery for spinning and weaving it into cloth, with the apparent intention of forming a stable and self-supporting community and giving the country a prosperity and peace that it has not enjoyed since the time of Djingiz Khan.

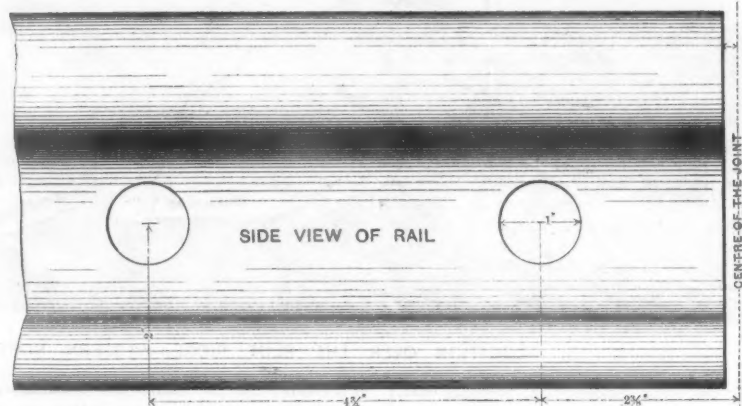
The Boston & Albany and Lehigh Valley Splices.

The cuts given in this number of the Boston & Albany rail section and splice, and of the various splices used on the Lehigh Valley, are of interest as showing the development of a form of splice first used, we believe, on the Lehigh Valley, as shown in their No. 1 splice section, adopted in 1869. The successive forms and weights of rail and splice on this road are given by Nos. 2 and 3, in which the growth of the bearing surface between the rail head and the splice, the gradual flattening of the splice angle and the development of a top flange to the splice are of much interest.

These splices have always been used with a suspended joint, and their record is given in the statement of the road-master of that road, which we reprint from our description of the Lehigh Valley worn rail as follows:

"Hardly any of our splices break until they have been in use at least five years. Very few of our splices for 68 lb. rails have thus far broken even when they have been in use 10 years. With one exception none of our splices for 67 lb. rails have thus far broken. None of our splices, either iron or steel, for 76 lb. rails, have broken or failed."

The Boston and Albany splice, for which the two bars weigh 28 1/2 lbs., is used on 213 miles of track as a supported joint. It was adopted in 1880, and since that time the broken splices of this pattern have averaged only 1 in 2,780 annually, "while we believe we have a good joint, yet we



BOSTON & ALBANY STANDARD SPLICE AND RAIL SECTION.

think the freedom from fracture is owing in a great measure to the fact that the joint is supported. At least ten per cent. of the fractures occurred at suspended joints between bridge ties. The breaks usually occur in the inside plate, the fracture beginning at the spike hole."

Contributions.

Future Railroad Revenues.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The present may be considered to some extent a transition period in the matter of railway revenues and expenditures, and many interested financially or otherwise in the workings of the railroad properties of the country are looking forward with interest, and it may be solicitude in some cases, to discover, if possible, what of good or evil the new era is likely to present. The last twenty years have been marked, as is well known, by steady declines both in the sums received for doing a certain amount of business and in the cost of handling the same. The character of the decline has not been the same, however, in both cases. The sums saved to the public at large by reduced rates have often been shown in print as have been the large proportionate decreases in specific rates. It is true that these lower transportation charges have to some extent been inaugurated by the different roads to aid in developing the regions through which they pass, or to build up some desirable industry, but the general fact remains that the sweeping reductions in all classes of railroad rates have been largely brought about by outside pressure, by water or rail competition, by public sentiment or by legislation.

To meet the decline in amounts received for doing a certain amount of work the railroads have been obliged in every way possible to reduce their operating expenses by using the most efficacious and money-saving methods which have been presented. Their efforts in this direction, aided by the general decline in prices of all materials and structures used in railroad operation, have had the effect of largely reducing expenses so that business is now done at cost figures which would have seemed impossible within a comparatively recent period. This reduction in cost has not continued lately in the same ratio as that in earnings, and the present outlook does not seem to promise a reduction in expenses pro-

portionate to that in the revenue received for doing a certain amount of work. While the savings that are yet possible under the present general system of railway operation will doubtless amount to large sums, yet the percentage of such savings to the bulk of the operating expense will, I think, be found comparatively small. There seem only one or two items of expense in which really any considerable percentage of savings may be looked for.

The reduction in revenue on the other hand promises, from the present outlook, to continue, and at no period in the railway history of the country has there been exhibited so much persistent pressure toward such reductions. The interstate commerce bill will, in its action upon the railroad system as a whole, doubtless have the effect of reducing rates in certain districts, as any reorganization of traffic matters is apt to have that result. Local rates are being actively canvassed, and the proceedings of the state legislatures teem with measures regulating railroad traffic in one way and another, many of them having been inaugurated since the passage of the bill by the general government. Some of these, if carried out, would be as serious in their results as was the Potter law which was put into force in Wisconsin, and whose provisions rested so heavily upon the public as well as the roads that its repeal was effected at the earliest possible moment after its effects were fairly appreciated. The general public, as usual, is watching every loophole by which each road may be pitted against its neighbor to the reduction in rates; and shippers, while claiming that equal rates to all are what they most desire and call for, are yet individually endeavoring to obtain some advantage not possessed by their fellows. Lastly, and by no means least, the attitude of many of the great lines of the country toward each other severely complicates the situation. At no time, we think, has there been so much retaliatory construction, where road after road builds into territory occupied by its neighbors; in many cases a complete system of parallel lines being undertaken. The construction of this character which is promised for the next two or three years amounts to thousands of miles. While some of this new road is the result of a general scramble in order to first occupy new and perhaps desirable territory, a large proportion is competitive road building pure and simple, and will have the effect of reducing the general average of rates along the territory so occupied.

The various tendencies I have referred to, which all lead to the application of pressure toward revenue reductions rather than toward cheapening the service, serve to show, I think, the force of the statement made at the commencement of this letter, that the present is a transition period in the history of railroad affairs. Some writers go further and consider the situation serious. Mr. L. S. Coffin, of the Iowa Railroad Commission, who has given much unbiased study to railroad matters, especially in the West, says: "I regard the present as one of the most critical periods of railroad history in our nation."

In fact, some roads have recently and in times past, even crossed the danger line, and the gross earnings have been unable to meet the operating expenses, and even a fair return on the capital borrowed. In such cases receiverships and foreclosures are the inevitable result, often rendering valueless the investments of the original shareholders. This state of affairs has arisen in various cases from carelessness in economical operations, from too great greed after business at non-payment rates, or from the want of a sufficient volume of business at reasonable rates. Looking at the history of all our large railroad corporations, how many are there which are not collections to a greater or less extent of lines which at one or more periods of their existence have been foreclosed and reorganized? Even the wealthier roads, which, under the "survival of the fittest" rule still prosper, do so by reason of the enormous volumes of traffic they are able to draw over their lines from connections and feeders. This volume of business spreads the fixed expenses over a wider field and is the only reason why any return is made from traffic at existing rates in many directions.

Even with these wealthier roads the steadily increasing pressure of competition results in lower rates, rendering the margin smaller and smaller and emphasizing the uncertainty as to the sources of future net revenue. From these various causes the present may be fairly considered a turning point in railroad history, and some change for the better seems a matter of necessity for the future welfare of the railroad world. It is this feeling in the mind of railroad managers that perhaps leads them to view the passage of the interstate commerce bill and the appointment of a commission with greater compassion than was expected by those opposed to the present railroad system. There is a feeling on the part of managers that some features of almost any change may be a relief, as the present outlook is anything but favorable, in spite of any agreements through pools or other traffic arrangements. The anti-pass inference must at least stop up some of the leakage that exists in the passenger revenues.

Recapitulating to some extent, we see that rate wars reduce figures, both for passenger and freight traffic below any possible estimate of the cost of doing the business. There is seemingly a reckless extension of many leading lines into territory occupied by others. Retaliation follows retaliation, and the rolling up of bonded indebtedness is something enormous. "He that dances must pay the piper," and it is from the traffic revenues of the roads alone that the means of meeting these increased obligations must come. In fact able writers already raise the question whether the wholesale absorption of capital in railway enterprises may not hasten the next period of financial stringency. This factor, it must be remembered, was an important one in the crisis of 1873, and the period of financial depression which followed for several years. Symptoms are not wanting at the present time that the needs of the investing public have been fully met, and some of the later issues of securities for new construction have not been taken with the readiness that characterized similar ventures last year. In another year, doubtless, higher rates of interest will have to be offered, in order to place railway loans at or near par.

The transition character of many railroad aspects applies to the character of the traffic handled also. The old theory that it is the local traffic along a road that furnishes the bulk of the revenue is fast being abandoned. The interstate business passing over a number of our leading lines amounts in some cases to 90 per cent. of the total business moved, thus indicating the length of haul for traffic as now handled. In fact, even for such traffic as is entirely within the borders of any one state there is but little that can be called local pure and simple. The influence of one road which crosses another is felt not only at the junction station, but at stations on each side of the junction point, and there are few roads in the Northern states which, for nearly the whole length of their lines, are not near enough to some competitor to feel seriously its influence in traffic rates and volume of business carried.

Returning again to the matter of traffic charges, we find that the character of the road and the amount of business done will make wide differences in the net earnings per ton or per passenger mile. The following comparisons from records that I have recently seen show how important a factor the outside through or inter-state business is as regards the operation of any road. Two lines passing through nearly the same general territory with about the same character of local business, and competing for the same through business, may present widely different figures for revenue and expense. In one case, which I have studied two lines under same management, were compared. One had many steep grades, necessitating small freight trains, while the other was essentially a low-grade line; the normal freight train being fully twice that which could be hauled upon the first road. A large through business had to be thrown over the first line rather than the second. The result was that the cost per ton per mile was fully thirty per cent. less on the heavy road. In still another case, we find a short road with comparatively small tonnage per mile, and with moderately steep grades, hauling freight at a less cost than other lines in the same territory with lower grades and heavier business per mile. This seeming

paradox arose from the fact that a large proportion of the business done over the short road in question was delivered to it or received at either end in full train loads. This business being through freight to and from points beyond the road in question, did not need any outlay for station expenses, and a low cost of handling business is the result.

These examples will give some idea of the powerful influence which a large volume of through traffic will have upon the cost of doing business, its influence overpowering the conditions of local traffic or in many cases the relative character of road and grades. As we have already said, the earning power of the large roads of the country will depend in the future upon the business they are able to gather outside their own lines. It is safe to say that but few roads now could pay expenses or returns upon capital used in building them from the returns of the local business alone. Such outside business must of necessity be done at comparatively low rates.

When I speak of low rates, however, I do not wish to be understood as meaning the ruinous figures which have ruled in what are known as rate wars. In fact one of the reasons why railroad managers as a rule have viewed the interstate bill with some favor, is that they hope to find in it a means of stopping unnecessary rate cutting, when some comparatively irresponsible line, at but little loss to itself, may seriously injure the traffic of its more solid competitor. When such cases are likely to arise in the future, the roads interested will doubtless have the same right to appeal to the commissioners for aid in adjusting matters that any shipper will have in calling attention to any other infringement of the provisions of the bill.

Attempts to forecast the influence upon railroad traffic of the workings of the new law vary widely according to the standpoint of the person predicting, and it is hardly safe to offer an opinion upon the subject. That there will at first be found irregularities, which in rectifying may bear hardly upon both the roads and the public we do not doubt, but that in the end the better chance of maintaining rates and avoiding rate wars, besides doing away with the cumbersome machinery of traffic associations, together with a curtailing of the past nuisance, will act to the benefit of the railroad world.

The various predictions we notice in the local press are curious in their utter variance as regards the probable workings of the law. One paper predicts that rates must be so re-adjusted that towns further west than Chicago, for instance, will not be allowed such rates as will enable the centres for certain classes of business to be moved from their present situation. The journals in the more western towns, on the other hand, are confident in their predictions of the benefits which will be derived from the prohibition of pooling or traffic agreements and a consequent era of low competitive rates. The various classes of persons interested will consider that they have the right of appeal to the commission, so one can readily see how varied will be the classes of questions which will probably arise.

Another thing which will probably be determined by an intelligent study of the situation by the commissioners is the fact that many so-called discriminations are really to the best interests of the country at large, and are necessary to the development of certain sections. This conclusion was arrived at by government commissions appointed to look into the matter of alleged injustice in both Great Britain and New South Wales, and there is no reason to doubt that the same results would be reached here.

As there is a chance for widely differing interpretations of some clauses of the inter-state bill, and as we see that such different renderings exist in the minds of some of the best authorities, there may be a semi-chaotic period before uniformity is reached. As appeal, in support of the law, can be made to the local courts, as well as to the commissioners, there is added chance for variance. Time alone can probably bring uniformity of action after a sufficient number of precedent rulings have been established to serve as a basis for a general interpretation of the law. A fair construction will probably work but little hardship, while the very onerous interpretations made by some writers would, if carried into general effect, be most disastrous in their results, in many cases, perhaps, even bringing the net revenue of certain roads down to nearly nothing. I do not, however, take the dark view of matters, but it seems probable that a smaller margin of profit exists in the future than the past has shown. How large this margin will be will depend largely upon the advances made toward more economical operation.

C. M. HIGGINSON.

Car Heaters.

BOSTON, March 1, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It seems to me that in the various discussions and trials of railway car heaters that one of the most important points in regard to heating passenger trains has been overlooked. I refer to the common practice of placing a cheap cast-iron stove in the baggage car while the rest of the train is equipped with the most improved heater, the Baker, Johnson or Spear being generally used. On a cold winter day this stove may be seen red hot and perhaps with the stove door open. In case of a collision or telescoping the fire is scattered through the agency of this death dealing stove, the baggage car in a large number of cases being smashed and having the rest of the train piled up on top of it, and in this way passengers lose their lives and railroad companies their property.

As an instance of this may be cited the recent accident on the Boston & Albany, near Springfield, the fire being caused by the stove in the baggage car.

If the railroad companies would give more attention to this point, eliminate the cheap stove from the baggage car,

and heat this car by the same system the other cars are heated, it might result in a great saving of human life and property.

I may add that the passengers do not see the stove in the baggage car, but are lulled into a false sense of security by observing that the sleeping cars and first-class coaches are equipped with a safe heater. When, however, the train strikes the inevitable stalled freight or the broken rail, the unseen stove gets in its deadly work and burns up the innocent steam heaters. The moral is, don't do things by halves, but make the baggage car as safe as any other part of the train.

The baggage man does undoubtedly deserve a hard fate for the way he handles the harmless trunk and the fragile valise, but in this case the passengers suffer too; and, therefore, for their sake, I would plead that if their baggage must be smashed, let them escape the ordeal of being roasted alive.

Yours truly, RESARP.

The Law of Baggage.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The inclosed question I do not find settled in any baggage traffic rules, and I ask if you have any case on record or reported law thereon. If so, I would like to see a copy. Kirkman's book I have, but it does not meet the point. The question is raised by commercial travelers, whom we allow 150 pounds, or any one.

Can a passenger claim free exceeding 150 lbs. baggage by presenting tickets enough to cover the excess weight? The baggage is strictly his own, and the tickets are presented to cover the rules and avoid paying for same. He will use but one ticket at that time, unless he chooses to give to friends going on train, or do as he pleases with them for future use when he has no baggage. Or, can a road refuse to check except on one ticket, and collect the excess?

WM. M. DUFFEK,

Gen. Pass. and Ticket Agt. Prov. & Worcester R. R. Co.

[The right of a passenger to have his baggage carried is a mere incident of his right to travel, and he is not entitled to separate the one from the other. Railroad companies have authority to make reasonable rules, and among others to require passengers to provide themselves with different kinds of tickets, according to the kinds of carriage which they engage. Probably a passenger would not be sustained by the courts in using a ticket upon one day in payment for mere transportation of extra baggage and in tendering the same ticket upon a later day in payment for a personal ride. —EDITOR RAILROAD GAZETTE.]

The Condition of Passenger Train Brakes.

CHICAGO, Ill., Feb. 24, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

While we are on the subject of accidents, and especially of recent accidents, I suggest that much good would be accomplished by the better application of the brakes which are already in use. I heard a superintendent, who is remarkable for the care which he gives to the condition of the brake apparatus upon his passenger trains, say he believed that on his road the condition of the brakes was such that they would not stop the train in much less than twice the distance that they would if they were in first-rate order and thoroughly attended to. He admitted that the brakes ought to be in charge of one competent mechanic, with authority to require them to be maintained in the best possible condition; as, when they are left to the ordinary inspectors or to be reported on by the brakeman, their condition can but be imperfect; and he proposed immediately to perfect the organization upon his road by the appointment of a competent man, to be nothing but an inspector of the brake-apparatus. Our conversation developed the information that the sleeping car companies, with a natural regard to the saving of their wheels, reduce the leverage upon their brakes below what is reasonable, so as to be sure that the heavy braking will all come on the wheels belonging to the railway companies; and I suggest that it would be a good plan for the superintendents of motive power to make a critical examination as to the amount of braking force which can be applied, on their trains, to the wheels of the sleeping and drawing room cars. As these are generally at the hind end of a train, it is very important that they should have at least as much retardation as the other cars.

This reminds me of the six-wheel trucks. Although it is quite feasible to apply the brakes to all the wheels of a six-wheel truck, do you notice any of the palace cars which have the brakes on more than four wheels in each truck? And if the brakes are applied feebly, as I have described, to those four wheels, can we be surprised at the distances which these rear cars have been able to run on their two pairs of unbraked wheels?

One might suspect that the brake apparatus on these heavy palatial cars was chiefly for show and not at all for use; indeed, instead of assisting in a quick stop, the brakes on the sleeping cars and drawing room cars might be counted out, especially where they have six-wheel trucks; and it seems to me that you might well call the attention of the Master Car-Builders and Western Railway Club to this matter, as a subject for discussion at their meetings. Suppose the question is put in this way: what portion of the proper braking force is applied to the sleeping and drawing room cars on your road?

ARCHIMEDES S. WATT, C. E.



Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The last terrible accidents have served to reveal in strong light a customary attitude of the newspaper press toward the management of the railroads. In discussing most of the affairs of life, it is usual to assume that the men concerned are governed by the ordinary laws of human nature, that they have the same motives as the rest of us, and at bottom have ordinary humanity. When railroads are in question, this assumption is no longer made. The "labor press," and that far greater body known to the labor press as the "Satanic monopolistic press," unite in speaking of railroad managers as a body of men in whom blind greed has killed humanity and reason. It is always well to remember, however, that the railroad manager, like the rest of us, does business to get a living, and that he brings to his work all the intelligence his Creator has given him, as does every other man and beast in the struggle for food. It should be remembered that the process of natural selection, acting on a most arduous and responsible calling, has brought about the result, that the high officials of the railroads are, as a body, men of much more than average mind and character. Putting aside any question of humanity, they have an enormous pecuniary interest in finding out and using the best and safest appliances. They well know, indeed better than any one else, how much money it costs to burn a bridge and a train, and to kill and maim a car-load of people.

The young man who is assigned to write a ringing editorial, and to give the railroad men fits, would do well to stop and reflect that very likely the infallible remedy he now suggests has been watched and studied for years by serious men, whose happiness and fortune depend upon the knowledge, judgment and candor they bring to the work.

Some of the general passenger and ticket agents are whistling before they are out of the woods, as it were, in their glee at the prospect of some relief from the "pass-fiend" and the advance-agent bore, taking the occasion of the interstate commerce law to withdraw passes and reduced rates, which are not in the least affected by it. It may be proper, on general principles, to stop passing employes' families, but where their rides begin and terminate in the same state the device of taking shelter under the law for the sake of "uniformity" will not be likely to deceive anybody; consistency in some other directions could perhaps be sought after with more profit; and, moreover, when the employe who wants to give his family a bit of an excursion happens to be one of the higher grades, such as ride in private cars, we suspect that some way will be found before many months to crawl under, over or around the state-line barrier. And in the matter of reduced rates, of course, it will be easy for any company that wishes to favor its heavy patrons to make out a *prima facie* case in defense of its action by offering the same terms to all customers whose business comes under the same conditions. The "condi-

tions" can be adjusted to any desired circumstances. A reduction of 50 per cent. in passenger fares to each person who ships sawdust or second-hand pulpits in 20-ton lots would doubtless come within the law, technically; and yet it would very likely be a virtual discrimination. Those who are over-zealous in their readiness to comply with the law and even to extend its application, should recollect how easy it will be for their competitors to find grounds for a different interpretation.

From time to time we have published discussions on the use of the piece-work system in railroad shops. The arguments for and against have been so fully given, and the details of its working so thoroughly formulated, especially in the papers by Mr. F. D. Casanave, published last summer in the *Railroad Gazette*, that there remains little to say. From the records during the last year, of a light manufacturing business, we are able to make a trifling contribution to the general subject. In the shop in question some forty men worked entirely by the piece. Their average weekly wages were \$17. The average weekly earnings for the year of the most efficient man were \$23, and of the man earning the least, \$13. That is, of two men working side by side, for a year, under precisely the same conditions, one earned 71 per cent. more than the other. Of forty men, one earned 35 per cent. more than the average and one earned 24 per cent. less. It would seem as if the injustice of paying all these men a uniform wage were pretty obvious. Indeed, men have before now struck for payment by the piece; and we may safely conclude that when they strike to be paid by the day the least efficient and industrious workmen control the movement. M. Godin, in his "Social Solutions," says:

"* * * Work executed upon time at a given rate is none the less humiliating to the workman. * * * The thing to do is to give the workman complete independence in his work—that is to say, his liberty. * * * Thus the workman regains his dignity."

It is a powerful argument in favor of a system that it encourages self-respect in the workman.

The letter from Mr. C. M. Higginson, Assistant Auditor of the Chicago, Burlington & Quincy Railroad, which appears in another column, points out the several causes which the writer believes to be tending to reduce the net revenues of railroads in the future.

The result which he predicts is probably coming—slowly and naturally—but we think that he is in error as to the weight and effect of the various influences. The Interstate commerce law is developing a school of commentators as experienced and learned in facts as they are varied in their conclusions; and it is too early to predict its results, but it is very doubtful if that, or the state legislation likely to follow, will diminish rates. Indeed Mr. Higginson points out that "one of the reasons why railroad managers as a rule have viewed the inter-state bill with some favor is that they hope to find in it a means of stopping unnecessary rate cutting;" and in an editorial of January 14, we showed the probability that the new law cannot and will not be enforced strictly except through the help of the "cumbersome machinery of traffic associations," citing the experience of the Prussian and Belgian state roads.

In the last few years the railroad managers have learned a great deal about the possibilities and methods of co-operation, and we may be sure that the lessons will not be fruitless in this emergency. At this moment a *modus vivendi* is fast maturing, and it will not be surprising if what to so many seems a grave menace to railroad interests should result in their gain. At the same time it is quite likely that the interests of the public may be served by the abolition of various real evils.

We believe, too, that Mr. Higginson is mistaken in the idea that the relative financial importance of local traffic is rapidly declining; and it would be rational to infer that hostile legislation would check competitive building, rather than that the two causes should conspire to the injury of railroad properties. Nevertheless, Mr. Higginson's letter is worth careful reading and serious thought.

SAFETY APPLIANCES FOR FAST TRAINS.

The verdict of the coroner's jury on the causes of the recent fearful accident on the Baltimore & Ohio at Republic appears to have been arrived at after careful investigation, and contains an unusual amount of sound sense. The various causes which contributed to the accident are clearly pointed out, and the verdict does not fall into the common error of indiscriminate blame, but endeavors to distinguish between the innocent and the guilty.

The verdict, though one of the best given on a railroad accident, fails to state distinctly what officers of the Baltimore & Ohio were responsible. The organization of the staff of that road is somewhat peculiar, and it is understood that little discretion is allowed to the local officers, the management being greatly centralized. It is therefore doubtful whether the local officers were to blame for the various shortcomings in the working of the line pointed out by the verdict.

If the local officers were not allowed a sufficient number of good engines and men in order to handle the traffic with safety and regularity, the fault must be with the officers at head-quarters. It is to be regretted that the coroner did not ascertain whether this was the case or whether the blame was due to the local officers, who did not sufficiently look after the men and property under their charge. During the last few years the changes on the Baltimore & Ohio staff have been unusually numerous, which gives rise to the suspicion that the officers of the Trans-Ohio Division have found considerable difficulty in working harmoniously with those possessed of supreme control at Baltimore. Friction and undue centralization are only too apt to lead to disaster in railroad affairs.

The fact that limited express trains are a luxury, and can only be run where special precautions are taken for their safety, very naturally escaped the notice of the coroner's jury, as that fact is as yet little appreciated by many railroad managers, who ought at least to know that a train running at 60 miles per hour cannot be stopped in twice the distance in which the same train can be stopped when running at 40 miles per hour. The distance—other circumstances being equal—varies as the momentum or *vis viva* of the train, and that varies as the square of the speed. In other words, if a train running at 40 miles per hour can be stopped in 1,600 ft., the same train when running at 60 miles per hour can only be stopped in 3,600 ft. Of course most brakes would stop trains in considerably smaller distances, but the *relative* distances will always vary nearly as the squares of the speeds.* This fact alone shows that special precautions should be taken for the safety of trains run at excessively high speeds.

Limited trains originated on lines provided with the block system, an excellent, well-ballasted road bed, double track, split switches, guard rails, and many other devices for securing safety. The result has been a very fair immunity from serious accidents. This is greatly owing to the fact that on both the Pennsylvania and New York Central the trains are run with very few stoppages, and, therefore, a high "journey speed," say 40 miles per hour, can be secured with a low maximum running speed rarely exceeding 50 miles per hour; but on many lines not only are no special safeguards provided, such as the block system, good distant signals clearly visible at a distance, interlocking gear, etc., etc., but limited trains are protected (?) only by the crudest appliances; stub switches, invisible switch stands, and sleepy conductors. Moreover, the unfortunate fast train has actually to run the gauntlet of these wretchedly guarded dangers at a higher speed. The stops are so frequent that in order to make time the speed between stations and down grades must be the maximum attainable, and is often fully 10 or 15 miles per hour beyond that ever necessary on the line where the train bowls along mile after mile at an even steady pace without a check or a spurt. Now the difference between the distance in which a train can be stopped when running at 50 and 60 miles per hour respectively is practically nearly 50 per cent., the squares of the speed being as 2,500 to 3,600, yet the limited trains on the well signalled double and quadruple track lines are running at the lower speed, and many trains on single track lines practically without signals must be run at the higher. Is this right? The engineer running at the higher speed is never safe if he takes his eye off the track, at any moment he may find that a Tiffin conductor has at last concluded it is time to stop the express. Is it fair to blame this man who has to flog his engine to the utmost to get the work out of her, while his neighbor on another

* The distance would vary exactly as the squares of the speeds were the brakes absolutely instantaneous in action, but in all brakes part of the distance is run while the brakes are gradually going on. If the time during which this action continues is constant, the distance run by the train while the brakes are being gradually brought into full power will vary directly as the speed. The length of the remaining part of the stop—while the brake is full on—will vary as the square of the speed. An example will make this clear. Suppose the brakes take 2 seconds to go full on, and when once full on will stop a train running at 40 miles per hour in 1,200 ft. Then the distance from application will be:

$$(58\frac{1}{2} \text{ ft.} \times 2) + 1,200 \text{ ft.} = 1,317\frac{1}{2} \text{ ft.}$$

Now 1,600 : 3,600 :: 1,200 : 2,700, therefore at 60 miles per hour the distance will be:

$$(88 \text{ ft.} \times 2) + 2,700 \text{ ft.} = 2,876 \text{ ft.}$$

If the distance were exactly as the squares of the speeds, the latter distance would be:

$$1,600 : 3,600 :: 1,317\frac{1}{2} : 2,984 \text{ ft.,}$$

or some 3 per cent. in excess of the actual figures.

road knows when once he has sighted his distant signal that he is right until he gets to the next block, and can therefore look round and see that his engine is working comfortably and is well off for fire, water and oil? It hardly needs the teaching of experience to show which man will have the fewest accidents and work his engine most economically. The gain in punctuality and regularity of running in all weathers is also obvious.

The coroner's jury state that the accident at Republic might have been mitigated if a better form of brake had been in use. This may very possibly be true. The Loughridge brake, as used on the Baltimore & Ohio, is simply a straight-air brake, similar in principle, though different in detail, to the original non-automatic Westinghouse air brake. It is well known that the automatic is quicker than the non-automatic air brake, especially with long trains. With short trains, however, the difference is not great, and as the limited express at Republic consisted only of five cars, it could hardly be called a long or heavy train.

It would, therefore, appear that the condition of the brake rather than the kind of brake was possibly at fault at Republic, and such accidents as Rio and Republic should remind railroad managers very forcibly of the fact that the best appliances are of little use unless they are kept in good working order. Brakes on both passenger and freight cars are often allowed to get into a state in which it is impossible that they can do good service in a sudden emergency. Our correspondent, "Archimedes Stevenson Watt," very forcibly calls attention to the matter as regards passenger cars, and measurements made on freight cars will show in many instances $1\frac{1}{4}$ inches of slack between wheel and shoe. Weak brake beams, lost motion in connections, and ill fitting and oily brake-shoes, are far too frequent in both passenger and freight equipment, and consequently the brakes are slow in application and hold very badly when applied.

Many of the brake beams under passenger coaches are far too weak and elastic to do good braking at high speeds. When the full pressure of air is applied, the brake beam yields so much that the piston goes the whole length of its stroke and strikes against the front cover, which thus receives a considerable portion of the pressure that should be placed on the brake shoe.

In some experiments made a few years since with some fine new cars, at that time the best of their kind, it was found that a sudden application of the brake with a high pressure of air would start a fracture in many of the brake beams and bend all so seriously that every piston struck the front cover. If this happened with new cars, what must be the condition of the average car which has been running several years? The brake beams are not as young as they were, and are partly rotten and weakened in consequence, while the pins and levers are all more or less bent and worn, increasing the slack.

Our notions of the distance in which it is possible to stop a train at a given speed are derived from the results obtained in formal brake trials, in which everything was specially prepared in order to show the best results. The leverage was carefully proportioned, and the pins and levers were well fitted, neither binding nor having undue lost motion, while the brake shoes were well bedded on the wheels. Results obtained at brake trials in Europe are often quoted here as being the latest obtainable, as brake trials became in vogue in Europe long after the brake question was settled here as regards passenger trains. But it is well to bear in mind that at such trials the air pressure carried was often very high, and the brake gear was fitted in a more expensive fashion than is usual here, all the beams and levers being of iron and very strong and rigid, all the pins being turned, all holes drilled, and two brake shoes being applied to each wheel in the train, excepting only the leading wheels of the engine.

Under such circumstances the results obtained were excellent, but it is a delusion to suppose that such results can be obtained here in every day practice. Not only is the brake gear more cheaply and hurriedly made in the first instance, but it is not kept up so as to do the best service in an emergency.

Another reason, independent of those given above, diminishes the full efficiency of brakes as shown by formal trials. The fastest trains in this country are now very generally composed almost wholly of cars with six-wheeled trucks. The brakes are only applied to four of these wheels, and consequently the distance in which the train can be stopped is at once increased nearly 50 per cent.

It is therefore to be hoped that railroad managers will make a few simple experiments in order to ascertain in what distance their limited express trains can be stopped when running at top speed. The experiments should, of course, be made with the brakes in ordinary condition as running, no special preparations

being made to put them in good order. The results would in all probability show that continuous brakes alone cannot insure safety to trains run at 60 miles an hour over roads practically totally unprovided with signals or interlocking arrangements. Even with the best continuous brakes an adequate warning of impending danger is necessary, and the recent terrible accidents have shown that the primitive methods in use at Rio and Republic did not give sufficient warning. The present method of trusting entirely to flags and hand-lamps and torpedoes when a freight train is stalled or fails to make the siding on time has led again and again to disaster. The adoption of a proper system of clearly visible fixed signals in conjunction with the block system should be imperative on all roads that have sufficient passenger traffic to warrant the running of specially fast passenger trains.

The White River accident shows forcibly the necessity for the full development of the automatic feature in brakes. As at present made, the best known form of brakes will apply themselves in the event of the train breaking in two; or the failure of the hose or train pipe, or any of its direct connections. These are unquestionably very valuable features, but experience has proved that a brake that would apply itself when the train has left the rails would have saved many lives. If such a brake had been in use at White River the cars in which so many lives were lost might possibly have been stopped on the bridge in the 400 feet available. A little delay and a few bruises would have been the worst consequence of the accident. An appliance to set the brakes when a wheel leaves the track can be easily and cheaply applied to any train, and need not necessarily involve any extra valve or moving part.

The full value of continuous brakes can only be realized when they are kept in good working order, are applied to all the wheels in a train, and are provided with means of automatically setting the brakes when the train leaves the track.

LONG AND SHORT HAUL IN ENGLAND.

The United States stands by no means alone in its difficulties about the long and short haul clause. The same trouble exists in England, and seems likely to exist for some time to come. In some respects, the English shippers have even more occasion for complaint than the Americans. Water competition is much more wide-spread. It directly affects rates at about two-fifths of the stations in the United Kingdom. While we have a few important ports and two main lines of inland water communication, England has a long line of sea coast all around her, with a multitude of ports easily reached from foreign countries, and no inconsiderable number of navigable rivers and canals reaching into the interior.

The result is that there is a great deal of discrimination in favor of international traffic. Since American cattle can be shipped direct to London by steamer, the only way for the railroads from Liverpool or Glasgow to secure their share of the London traffic is by making special rates for it, lower than they will give to home traffic of the same kind. In like manner, French hops are given lower rates than Kentish hops; Norway lumber lower rates than English lumber; the iron manufactures of Germany lower rates than the iron manufactures of Birmingham. Such instances might be multiplied indefinitely.

There is one respect in which these discriminations seem a great deal worse than ours. In the majority of cases, our lowest rates are given to stimulate the export trade, but the English rates are generally in favor of the import trade. The English manufacturer insists, not merely that he is given no protection, but that the railroads are actually permitted to give special bounties to the foreigner by the system of low rates for foreign traffic. He says that if the government will not protect him it should at least not allow the railway to protect the foreigner.

In theory, it is illegal in England to charge more for the short than for the long haul. This is not the result of any legislation. It has been settled by a series of judicial decisions. At first, the positions taken by the courts were conflicting, but of late, especially in the appointment of the railway commissioners, they have all tended one way—that is, toward a rigid application of the principle.

But several causes have combined to prevent the theory from being carried out. In the first place, the decisions which establish the principle carry it to an extent which it would be quite impossible to admit in practice. They go back to the old theory of basing rates on cost of service pure and simple. One of the more recent decisions (Broughton & Plas Power Coal Co. vs. G. W., 10 R. C., page 1), which we noticed editorially at the time, insists that the railways must

make more profit on their through traffic than they do on local traffic of the same sort. Now of course this is nonsense. It could not be systematically carried out on any road, without disaster to all interests concerned. It is an instance where the commissioners have carried out their views so far and so rigidly that they break by their own weight. The railroad companies obey the decisions in the specific cases; but elsewhere, they go on as before, knowing well that the expense of a lawsuit will deter other shippers from taking advantage of so doubtful a principle, however rigidly the courts may try to enforce it.

And in this matter the companies have the support of quite influential sections of the public. The last Parliamentary Committee took direct issue with the views of the courts. It said that a preference is not unjust so long as it is the result of fair competition. In other words, the Parliamentary Committee went farther in qualifying the law than Mr. Fink or almost any other railroad authority desires to do under the Inter-state Commerce bill. Mr. Fink simply says that such preferences may not be unjust; leaving it to be decided by the circumstances of each individual case. The English Parliamentary Committee says that they are not unjust, as a general thing; an exception sufficiently wide to overthrow the whole principle.

We notice with interest that the majority report of the Royal Commission on the Depression of Trade adopts the same view—if indeed any of the reports on this subject can be called majority report. The members of this Commission differed in their views on almost every point; but there was none on which they differed so thoroughly as on the matter of railroad legislation.

Of the 23 members of the Commission, 11 take the ground that "the inland producer who can only move his goods by railway is at a disadvantage as compared with the foreign producer or the producer on the seacoast who enjoys the benefit of cheaper water carriage;" they "see no justification for depriving the latter class of the advantage which their position gives them;" and point out that "the relative position of the inland producer has been distinctly improved by the introduction of railways." This view is incorporated in the majority report; but of the 18 members who signed that report 7 dissent from this part of it, and say that there "appears to be no adequate reason" for such preferences. One of the minority reports, signed by 4 members, takes even stronger ground against them; while Mr. O'Connor's minority report says nothing explicit on the subject.

The lesson of all this is, that if you make a law too rigid it becomes a dead letter. Not merely have the railroads resisted its enforcement, but they find a great deal of support from public opinion. Had the courts insisted on less, they would probably have accomplished more.

In America we are in some respects more favorably situated than in England. We have a larger proportion of railroad men who, like Mr. Fink, see the evil of local discrimination and would like to check its worst forms. On the other hand, our law provides for a commission which can make exceptions in those cases where the law would work special hardship. With tact on both sides it ought not to be difficult to adjust matters. Some forms of discrimination do great harm to the public and comparatively little good to the railroad. Others are almost necessary to the prosperity of the railroad; but these are generally the ones which do the public little or no harm. If the company insists on its right to practice both kinds, it rouses public hostility; if the law tries to stop both kinds, it generally breaks down. We hope—and we may fairly say we expect—that the Commission will show good judgment in drawing the line between the two.

THE LAW OF TICKETS AND TIME TABLES.

Recent numbers of the *Central Reporter* contain, among accounts of the decisions of all the important state courts, several cases which illustrate the law of tickets and time-tables in novel aspects. In one instance, the conductor on a train which had just passed through Roseville on its trip from Newark to Orange, returned to a passenger whose ticket the conductor had already accepted, and told him, in effect, that he had given only a Roseville ticket, but now was stealing a ride to Orange. The passenger (whose name was Walsh), positively denied this; declared that he had bought and given to the conductor an Orange ticket; and said that the conductor must have mixed the tickets of the various passengers as he took them, and have mistaken which ticket Walsh gave him. The conductor would not accept this explanation, but declared that he would put Walsh off the train. Walsh protested, but as the conductor was about to call a brakeman and have him put off by

force, he submitted, went peaceably, and brought a suit against the company for damages. The point of the case was, how much damages he should be allowed. The jury believed Walsh's story about his ticket, and thought it was the conductor who made the mistake; and the counsel for the company argued that if such were the facts, Walsh was only entitled to claim compensation for what he had lost; which was the price of the ride of which he was deprived, or the value of the time he spent in walking home, about a mile. But the judges said that the law, in these cases, even when the conductor has acted under a mistake, takes notice of the indignity involved in putting a passenger off the cars, and that the jury were authorized to give such damages as they thought proper for "injury to feelings." And they sustained a pretty heavy verdict.

Forty-eight thousand, seven hundred and fifty dollars was the verdict which a somewhat hasty, injudicious conductor brought upon his company by his rigorous enforcement of a rule for expelling passengers unprovided with proper tickets. The sum seems large, but is so stated in the published report. The passenger in question, at Erie, bought a ticket for a passage from Erie to Cleveland and return. He traveled upon it to Cleveland; next evening he took a train bound for Erie, on his return trip. This train was a "limited express," and by the general rule of the company, excursion tickets were not good upon the limited express; the passenger should have taken one of the other trains. The ticket, however, did not give notice that it was not good on the limited express; the only condition it contained was that it was "good only for thirty days." Whether the passenger knew that he was not at liberty to take the limited express was disputed on the trial. He swore that he supposed the ticket was good on every train; he had used similar tickets on the road for years without objection made. There was testimony by the ticket agent and some of the trainmen to the effect that they had given him information, but on this question the jury sided with the passenger, so that the case stood as if he took the limited express under an honest mistake as to his rights. Shortly after the train started the conductor came for tickets. The passenger offered his excursion ticket. The conductor refused it, and said, "My orders are to put you off, your ticket is no good," and pulled the bell to stop the train. The passenger offered to pay fare in cash, which the conductor refused; he then begged to be carried to the next station instead of being put off at that spot, but the conductor answered, "My orders are to put you off, and off you must get. I obey orders if I break owners." The passenger had no choice but to follow the conductor out of the car. When he stepped off, the conductor pointed to a light at some distance, and said, "That will take you to the depot." The train started onward. The stoppage was made in a large yard such as often adjoins an important depot, filled with numerous complicated tracks, and with locomotives, loose cars, freight trains, etc., standing here and there, or running backward and forward without notice; it was obscured by a bridge and other structures, and was upon the whole a dangerous place for an inexperienced man in the night time. The passenger walked toward the light pointed out by the conductor, but it proved to be the headlight of a locomotive; he then turned in another direction, but came upon a train of cars backing; and in a third attempt to make his way to the depot he was struck by something coming from behind him, was knocked down, stunned, and permanently injured. The lawyers entangled and beclouded this case so much with their "ifs" and "whereases," their "exceptions" and "assignments of error," their "points" and "hypothetical cases," that there is difficulty in giving any simple yet correct statement of what was decided; but the general principle explained by the Court was, that conductors, in putting passengers off a train, must distinguish between an intentional trespasser and a passenger who has paid fare, but by some honest mistake is upon a wrong train. This passenger was bound to ascertain, by the time-table and rules of the company, which train was the proper one for his ticket, and he was not entitled to ride on the limited express merely because he supposed the ticket gave him that right. But he was merely a mistaken passenger, not a wrongful trespasser; he had bought a ticket for Erie; he had been allowed by the trainmen to enter a train bound for Erie; and he could not lawfully be treated as a wrong doer endeavoring to ride without paying fare. The conductor was bound to carry him to a safe place, before expelling him from the train. As the acts of the conductor were done in the discharge of his duties as such, the company was liable; and as the conductor's course involved a reckless

indifference to the consequences which the passenger might suffer, the company was liable, not only for compensation for the passenger's actual injuries, but also for damages reasonable to punish the misconduct.

This case shows the danger of too rigid an enforcement of general rules. Rules are important, indeed necessary, and fatal consequences have often resulted from a negligent disregard of them; but upon the other hand, a reasonable discrimination in applying them is required of conductors by law, even when it does not appear to be allowed by the wording of the rule. No company can frame rules so exactly and perfectly that they will precisely fit the circumstances of all possible cases, and the railroad officer who habitually performs his duties in the spirit of the maxim, "obey orders if you break owners," is likely to prove an expensive assistant to a company.

A passenger for Stanton reached the station just as a train running in the direction of Stanton was approaching. He hurried to the ticket office, asked for "a ticket to Stanton," got one, and when the train reached the station, took seat in the car. After the train started, he learned that it was one which would not stop at Stanton; and that he would be obliged either to ride to the station beyond Stanton and walk back, or to stop at the station before Stanton and take a way train from there. He chose to stop at the intermediate station; however, being a "spunky" fellow, he would not buy another ticket and take a later train, but pushed onward on foot; and then sued the company for selling him a wrong ticket. He did not claim that the ticket agent or any one else told him that the train drawing near while he was buying his ticket would stop at Stanton, but he testified there was a usage at that office for the ticket seller when he saw a train approaching, to stop selling tickets except for that train and for stations at which that train would stop. He therefore contended that when he saw a train coming, and asked for a Stanton ticket and got it, he had a right to rely on the usage, in taking a seat for Stanton in the car. But the company proved that a schedule of movement of trains hung in the station, which showed that four trains daily stopped at Stanton, but this particular train passed directly through. The judges then said that the passenger ought to have consulted this schedule, or at least to have asked the ticket-seller or some of the trainmen whether the train would make the stop. The usage to which the passenger testified was not very distinctly proved; and if it had been, the ticket agent had not authority to set up a usage contrary to the printed time-tables, which could expose the company to lawsuits. The passenger urged that his ticket was marked "good for this day and train only;" but the Court said this made no difference.

An extract from the opinion of the Court will be found instructive upon the law of time-tables:

It is well settled law that railroad companies, from the nature and necessities of their business, must have the power to make reasonable rules and regulations as to the manner of performing their duties as public carriers; that is to say, as to the hour and schedule time for starting and running their trains and as to the places on the route at which particular trains shall stop in transit. Schedule posters informing the public of the time of departure from particular places, and the destination of the several trains are placed in the ticket offices, station houses and public places in view of the public, and time-tables are always on hand for distribution, that passengers may be well informed of the hour at which and train by which they may reach any desired destination on the line of the road. Being thus informed or afforded the means of information, persons desiring tickets of travel are expected to inform themselves as to the train they wish and must take for their destination; and if they do not understand or see the notice, it is their duty in law to inquire and learn what train they should take to reach the point they wish; and if a mistake is made, not induced by the railroad company, against which ordinary diligence as to inquiry would have protected, no redress against the company will be accorded.

CAR HEATING.

There appear to be three distinct methods of car heating by which greater safety may be obtained, as compared with the present style of cast-iron stove loosely secured to the floor of the car. A stove may still be used, but so constructed that it cannot be upset, and set fire to the car. The various devices for attaining this object are well known, and hardly need discussing. A wrought-iron or steel boiler or heater may be placed in or under each car. The third and remaining method of heating is to take steam from the engine.

The fact that car heaters do occasionally explode is not a convincing argument against any method of heating cars based on some modification of the well-known Baker heater. All boilers are liable to explosion, and where salt water is used and the attendants

are unskilled, safety valves will occasionally stick with disastrous results. It does not appear, however, that the explosion of any heater has ever caused any loss of life. The end of the car is shattered and the passengers suffer some inconvenience. In a case which is reported to have occurred on the 22d ult. on the Wabash, two passengers were slightly injured, and the car took fire from the lamps and the fire in the heater. The passengers, however, had ample time to escape. In the ordinary stove massacre, the passengers are first imprisoned by the effects of a collision or derailment, and while in that helpless confinement, are roasted alive. A simple explosion does not damage the car sufficiently to prevent egress, and therefore the passengers can escape. It is of course possible that a collision might cause an explosion, but such an event has not apparently been recorded.

Fire or boiling water under pressure are both, to a certain degree, objectionable in a passenger car, but the question is, can they be made practically safe? This question can only be solved by experiment, and by searching the records of past accidents.

Many local trains are heated by steam from the engine with excellent results, and the general testimony is very strongly in favor of this principle. The consumption of steam is undoubtedly small, but is probably somewhat higher than stated by the advocates of the different methods of heating from the engine. The coal consumption of the locomotives on the elevated roads is some 10 per cent. greater in winter than in summer. Some of this difference is undoubtedly caused by the increased travel, the number of passengers being considerably greater in the depth of winter, and decreasing month by month as the summer advances.

The amount of coal burnt per passenger is, however, the same summer and winter, which tends to show that the amount of steam used in heating the cars is very small. The opinion of Col. Hain, the General Manager of the Elevated, on this matter is entitled to considerable respect, as he has had more experience with this matter than any other railroad manager.

Col. Hain believes that it would be perfectly feasible to heat long trains of ten or twelve cars from the engine and that the consumption of steam would be very small. The increased amount of coal burnt in winter is partly due to the increased number of passengers, which increases both the weight of the train and the length of the stoppages at stations. The running speed has, consequently, to be greater in order to make up for the delay at stations. The increased radiation of heat from the boilers is also another cause of increased consumption in winter.

It is obvious that no theoretical calculation will show the quantity of steam required to heat cars. Any leakages in the joints and couplings, and the direction and force of the wind, will largely influence the quantity of steam required.

The question of joints and couplings is a very important one in heating cars from the engine, and it is obvious that leaky couplings may make it impossible to adequately heat the rear car while the front cars are perfect ovens. The steam has been all lost on the way. The drippings freezing on the track at stations constitute another serious objection, which is, of course, not felt by the passengers on the Elevated. But a slip at a station where trains are moving may often have serious consequences, and the drip from steam pipes forms a remarkably slippery icy surface on which many passengers might break their limbs.

There are certain obvious advantages in heating each car independently. A car with a boiler carried either inside or outside, can be sent to any point, and is independent of the engine, not only in a snow blockade, but at any time. It can be side-tracked or can be run on a road where improved heaters are unknown. A car heated from the engine is, on the other hand, not only dependent on the engine, but cannot be run with an engine that is not fitted with a special steam pipe and peculiar coupling. There can be little doubt that the principle of heating cars from the engine will be largely used, but if it is to become general throughout the country some uniform hose coupling should be adopted by all the various systems of heating that convey steam from the engine. Unless this is done, any extensive interchange of cars heated from the engine will be impossible.

The system of heating from the engine possesses many obvious strong points. It is not only confessedly safer than any independent heaters which involve fires in the cars, but it is simpler, lighter and, probably, would require less attention. The engineman and fireman can be always trusted to look after their boiler, but the average brakeman, and even the average conductor, is not a model boiler attendant. The cost of keeping the hose and couplings in repair would probably be far smaller than that of keeping

heaters, with their coils and grates and doors and pressure gauges, etc., in good working order. The saving in space and dead weight are also items in favor of heating from the engine.

Greatly increased safety will be secured, whether trains are heated from the engine or by improved modifications of the original Baker heater. But any improvement in the manner of heating the passenger cars will be rendered worthless should the old stove still be retained in the baggage, mail and express cars. These cars in most accidents set fire to the rest of the train, and, moreover, generally bear the brunt of a collision, and are therefore most liable to have an overturned stove. Any improvement in heating apparatus must extend right to the head of the train.

The Pennsylvania Railroad Report.

The report of this company for the year ended Dec. 31 1886, shows that it, in common with the other trunk lines, has been prosperous, increasing both its gross and net earnings; this gratifying result being due to increases in both rates and traffic.

The gross earnings on the lines east of Pittsburgh and Erie were, in 1885, \$45,615,034, and in 1886, \$50,379,077, an increase of \$4,764,043. The expenses including rental and interest on equipment, increased \$3,498,863, leaving an increase in the net earnings of \$1,255,180, or 10 1/2 per cent.

The traffic for the last five years is as follows:

Ton-miles: E. of Pittsburgh.	W. of Pittsburgh.	Total.
1882.....4,862,702,339	2,739,814,765	7,592,547,302
1883.....5,066,083,175	2,693,140,873	7,759,224,048
1884.....5,114,912,189	2,576,659,303	7,691,581,492
1885.....5,486,165,363	2,883,675,415	8,369,840,778
1886.....5,691,216,707	2,969,637,781	8,660,854,488

From which it appears that the freight traffic increased over last year in about the same proportion east and west of Pittsburgh, being about 4 per cent., and the maximum ton-miles of the years named. The passenger-miles east of Pittsburgh increased 3 per cent. over the previous year, but west there was a decrease of some 9 per cent., the whole showing a decrease of only 1/10 of one per cent.

The net earnings of the eastern system plus the surplus or minus the deficit of the western have been for eight years:

Year.	Year.	Year.
1879.....\$15,861,179	1883.....\$20,148,771	
1880.....19,707,077	1884.....18,473,250	
1881.....20,092,711	1885.....15,053,245	
1882.....20,326,728	1886.....17,941,923	

An increase over last year of \$2,888,678, or 19 per cent., but little less than in 1884 and \$2,080,744 more than 1879.

The total earnings and expenses of the eastern and western system, including in the latter the controlled lines (Chicago, St. Louis & Pittsburgh, Grand Rapids & Indiana, St. Louis, Vandalia & Terre Haute, &c.), have been for five years:

Gross earnings.	Expenses.	Net earnings.
1882.....\$101,514,923	\$63,385,714	\$38,129,212
1883.....103,653,532	69,917,056	33,736,476
1884.....97,849,875	64,434,317	33,415,558
1885.....92,994,549	61,699,901	31,294,648
1886.....101,697,931	67,103,715	34,594,216

As compared with last year the gross earnings increased \$8,703,432 or 9.3 per cent.; the expenses \$5,411,814, or 8.8 per cent., and the net earnings \$3,291,618 or 10.5 per cent. The gross earnings are the largest except in 1883, but the net are only greater than 1884 and 1885, the expenses in 1882 being \$1,717,001 less than in 1886, although the gross earnings were about the same.

The earnings per ton and per passenger per mile on the eastern system have been for the last eleven years:

Ton-mile.			Passenger-mile.		
Rec't.	Cost.	Profit.	Rec't.	Cost.	Profit.
1876.....0.915	0.690	0.255	2.056	1.055	1.001
1877.....1.013	0.615	0.398	2.323	1.734	0.530
1878.....0.930	0.545	0.394	2.309	1.712	0.597
1879.....0.824	0.480	0.344	2.235	1.709	0.546
1880.....0.918	0.540	0.378	2.232	1.674	0.548
1881.....0.857	0.517	0.340	2.276	1.615	0.631
1882.....0.874	0.554	0.320	2.249	1.663	0.586
1883.....0.861	0.562	0.319	2.297	1.626	0.671
1884.....0.804	0.518	0.286	2.258	1.621	0.637
1885.....0.695	0.490	0.205	1.950	1.466	0.484
1886.....0.755	0.492	0.263	2.114	1.611	0.503

The increase over the previous year is in freight earnings .060 cent, or 8.7 per cent.; in expenses, .032 cent, or 7 per cent.; in the profits, .028 cent, or 12 per cent. In the passenger there was an increase in the rate of .164 cent, or 8.4 per cent.; in the expenses, .145 cent, or 10 per cent.; in the profit, .019 cent, or 4 per cent. These increases, when contrasted with those of the ton-miles and passenger miles, show conclusively that the increase in earnings was chiefly due to the increase in rates, and not to the increase in traffic. It is pleasing to know, in this period of low rates, that one railroad has been enabled to increase them. It is, however, accounted for by so large a proportion (92 per cent.) of its traffic being local, and, therefore, more immediately under control.

On the New Jersey Division, after paying the guaranteed rental, there has been a loss every year since the lease, with the exception of the Centennial year (1876), but it must be borne in mind that all the costly terminal expenses at Jersey City are charged to this division, which if distributed over the lines east of Pittsburgh & Erie would relieve it, so that the result would undoubtedly be a profit instead of a loss.

The following shows the losses of that division for the respective years since 1873 (1876 excepted):

Year.	Loss.	Year.	Loss.
1873.....\$31,161	1881.....\$302,865		
1874.....447,996	1882.....568,759		
1875.....1,482,518	1883.....653,915		
1876.....1,136,775	1884.....593,536		
1877.....939,889	1885.....159,497		
1878.....1,035,309	1886.....179,015		

The financial result of the operations of the entire property of the company for the last three years is as follows:

1886.	1885.	1884.
Net earnings, Pa. R. R. Div.....11,983,037	10,446,771	12,621,778
Income from investments, etc 4,459,418	4,857,070	4,180,774
18,442,455	15,299,841	17,111,552
Deduct as follows:		
Interest, rentals, etc.....7,467,485	7,146,156	6,926,023
Loss on New Jersey lease.....179,010	150,407	593,536
Purchase of guaranteed securities.....69,885	58,621	600,000
Sinking fund.....324,800	324,830	277,400
Allegheny Valley R. R. deficit 608,390	701,575	608,330
Frederick & Penn. Line deficit 15,000	15,000	15,000
At. Steamship Co. advances 90,000	90,000	.....
Old claims and charged for depreciation.....623,756	363,355	1,020,692
Advanced to Penn. Co. 607,093	1,000,639	.....
Paid on account Trunk Line Pool.....411,972	.....	.....
Paid for property in New Brunswick, N. J., destroyed by fire.....265,000	.....	.....
Total charges.....10,812,407	9,859,673	10,131,031
Balance.....5,630,048	5,440,168	6,980,521
Per \$100 of stock.....\$5.94	\$5.74	\$7.45
Dividends.....4,738,893	4,738,893	6,560,787
Surplus.....891,155	701,275	419,734

The amount expended on capital account during the year, less cash received from auxiliary lines, was \$4,980,284.20, which was obtained from the following sources:

Stock issued, 74,869 shares.....\$3,743,450.00	
From surplus profits.....891,155.50	
From miscellaneous.....345,678.70	
\$4,980,284.20	

35,984 cars have been purchased through the medium of car trusts at a cost of.....\$18,637,000
Of which there has been paid.....10,847,000

Leaving due, Dec. 31, 1886.....\$7,790,000

A Toledo correspondent of the *Railway Service Gazette*, who says he is a Lake Shore trainman, gives figures showing that on the Chicago Division of the Baltimore & Ohio road the pay of conductors and brakemen is from 30 to 40 per cent. less than that of the same grades on the Michigan Division of the Lake Shore, which is parallel to the Baltimore & Ohio. A conductor on one road gets about the same as a brakeman on the other. The correspondent, after referring to the long hours and other hardships of trainmen, says:

"The Michigan Division of the Lake Shore is famous for the few accidents which occur. There is probably no railway in the world running as many trains over a single track and employing so many men, where there are fewer accidents to persons and property, than on this division. No doubt part of this is due to good management, with which this division has always been blessed, but a larger part is due to the men holding subordinate positions. Every man of them, from the brakeman up to the highest official, feels that he is well paid for his service and is always on the watch to avoid accidents. No matter how hard he is worked or how tired he may be, he will not neglect his duty from a sense of loyalty he feels for the company, induced by the liberal wages and good treatment he receives. He could not possess this feeling if he was working for half pay and knew his family were suffering for the necessities of life."

Without drawing any conclusions from this particular instance, we can readily assent to the essential truth of these views: and there are few readers who will deny that this phase of economics has a very important bearing in railroad management, and, we may say, there are many roads other than the Baltimore & Ohio where there is great need of its study and application.

The fact noted by the engineer of the Boston and Albany in our description of the splice used by that road in this issue that 10 per cent. of the breaks were in suspended joints on bridges is not conclusive as to the superiority of the supported joints, in the absence of knowledge as to the percentage of length of bridges, still it points strongly in that direction. It is not probable, however, that its bridges are anything like 10 per cent. of the whole track length, and furthermore the breakages on bridges should be a smaller proportion of the breakages on the same length of ballasted track, owing to the superior uniformity of the support given to the ties on bridges and the freedom from interference by frost. Furthermore it appears that the Boston & Albany is satisfied with a 28 1/2 lb. splice of rather indifferent proportions with a supported joint, while the Lehigh Valley, beginning with a 32-lb. splice with a suspended joint, has gone on increasing the weight of its splice up to 56 lbs. in 1886. It is, of course, to be said that the Lehigh Valley has been more progressive and less content to rest satisfied with a fair result, so that instead of the Boston and Albany 1 in 2780 annually since 1880, with a 28 1/2 lb. splice, the Lehigh Valley is able to report with about the same weight of rail and a splice weighing somewhere in the neighborhood of 50 lbs. no breaks since 1881.

The New York Railroad Commission reported to the Legislature on Feb. 25 the results of its recent hearing on heating and lighting cars. The report, signed by Commissioners Kernan and Rogers, is very cautiously worded. The well-known advantages of heating from the engine and of having a heater for each car are fully rehearsed, and the equally familiar disadvantages of both are also carefully enumerated; on the whole, the only bill they feel willing to report is one requiring that after this year no heater be used in or on a car unless it is safe: and that oil less than 300° fire test be prohibited. The liability of gas to be ignited and exploded in a collision is recognized, but no mention is made of it in the bill, nor of electric lighting. The bill has a section requiring proper floors and guards for "bridges and approaches" and posts to protect bridge trusses.

Commissioner O'Donnell dissents from the report of the majority, upholds steam heating [from the engine], and asserts that kerosene or any other inflammable oil upon a passenger car should be prohibited, and proposes a law to this

effect. He also proposes a law to prohibit the heating of cars by stoves or furnaces kept inside.

An intelligent correspondent of the *Springfield Republican*, writing from Pittsfield, Mass., while commending the course of the Boston & Albany road in making experiments in safe car heating before this winter's terrible warnings were given, justly criticises the Massachusetts Commissioners for saying that the road was "faithfully trying" improved methods, so long as the new equipment is on only one train, and that one which travels only half the length of the road. The correspondent adds in reference to cars not belonging to the road:

"One would think the Wagner Company had had sufficient shock at Spuyten Duyvil, where Senator Wagner was killed; but if not, the Boston & Albany has been known to assert itself before this. They will not take Wagner cars without air brakes in order or with broken wheels, why should they any longer with stoves? Public opinion would most heartily indorse such action, for public opinion is wrought up on this question. They wait for Legislatures to say 'you must.' In the meantime this winter is going by and nothing is done. Will a sign from heaven move the railroad companies?"

In another column we note the arrangement by arbitration of a dispute—averting a strike of the Connellsville coke workers. This is as it should be. While compulsory arbitration is in conflict with what we believe to be the principles at the bottom of an ideal democracy, the sooner employers and employed learn to live together, respecting each other's rights and liberties and meeting and adjusting their differences without appeal to governments, courts or violence, the better for all. The arbitration bill which has passed both houses of Congress, provides for a board with power to send for witnesses and papers, and for the payment by the government of the expenses.

It is suggested in another column that science may evolve a method of heating trains by a chemical process, involving the use of neither fire nor steam. We may well suppose that this will be done long before man is nourished, as Dr. Werner Siemens suggests, by food prepared from the elements by chemistry. Dr. Siemens has provoked much learned discussion, but his works prove that he is no barren idealist, and his demonstration of the steady acceleration in the velocity of scientific achievement gives hope that the car-heating problem will soon be solved.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887 is given in the current number of the *Railroad Gazette* as follows:

Chesapeake & Nashville, in Tennessee, since Jan. 1, 16 miles.

Chicago, Milwaukee & St. Paul, in Iowa, between Minilla and Sioux City, new track, 21 miles.

San Bernardino & Los Angeles, in California, since last reported, 7 miles.

Union Pacific, Cheyenne & Northern branch, 25 miles.

This is a total of 69 miles for the week, making 456 miles reported thus far for the current year. The new track reported to the corresponding date for 14 years has been:

Miles.	Miles.	Miles.	Miles.
1887.....456	1883.....261	1879.....141	1875.....90
1886.....193	1882.....619	1878.....204	1874.....161
1885.....127	1881.....254	1877.....82	1873.....38
1884.....213	1880.....375	1876.....252	1872.....294

This statement covers main track only, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

Report of the Proceedings of the Twentieth Annual Convention of the Master Car-Builders' Association, June 8, 9, and 10, 1886.

This report is unusually full and appears to be very carefully edited. The index is unusually complete and the illustrations of the various standards adopted render the report valuable for reference.

Report of the Proceedings at the Annual Convention of the Master Mechanics' Association.

This volume, which has also just been issued, will be found to contain much valuable information on subjects connected with the construction, design and working of locomotive engines.

Sleeper's Piston-Rod Packing.

The accompanying illustrations represent a form of metallic packing extensively used for locomotive piston-rods and valve-stems on the Chicago & Northwestern. The packing differs from most metallic packings in two important particulars: The wear is not taken up automatically, and is not taken up by a cone or any similar device, which takes up the end and the circumferential wear simultaneously. In this packing, the engineer has full control of the adjustment of the packing, and means for making the packing steam tight endways and tightening it round the rod are quite distinct, and can be handled independently.

In fig. 1 an outside view is shown of the packing complete as applied to a locomotive piston-rod. In fig. 2 the packing is shown with the outside half removed, so as to show the packing rings and method of adjustment.

The ring with ratchet teeth and small pawl, shown in fig. 1, is screwed with a fine brass thread, and as it is turned, forces the packing-rings endways, and keeps them tight in that direction. The packing-rings are not coned in any way, and, therefore, any endways motion does not tighten them upon the rod. The adjustment which makes the packing-rings grip the rod more tightly is shown in figs. 1 and 2, and consists of a screw which gears into the teeth of a worm wheel

ring shown in fig. 2. The screw has a square head, and can be tightened by a suitable screw key.

The worm is cut on the outside of this malleable iron ring, and on the inside are cast cams which bear against short semi-elliptic springs. These in turn bear against a flat coiled spring, which encircles the packing rings, and distributes fairly the pressure of the semi-elliptic springs.

The packing rings are of rectangular cross section, and are made of four or more pieces which interlock in a manner not easily understood from a drawing. They are made of babbitt metal cast in carefully finished iron molds, and have very smooth surfaces, and fit together very closely. The ends are faced in a lathe and bored, but otherwise the packing rings need no machining.

It is obvious that as the screw is turned by a suitable screw key, the worm revolves and the cams force the springs tighter against the packing-ring.

The advantage claimed over automatic packing is that with an unequally worn rod the packing-rings being held to the rod directly by springs can yield at every stroke of the piston, while where a cone is used, the packing once tightened cannot slack again, and consequently will not work well where the rods are unequally worn. Of course any non-automatic packing can be ruined by being made too tight, and this is a serious evil with many engineers.

It is always found more difficult to pack valve stems than piston rods, and this difficulty is generally considered to be due to the fact that the wear of the valve stems is more uneven than that of piston rods. In the latter the stroke is always the same, while the travel of a valve varies continually. Valve stems are therefore worn smaller about the middle of their full travel, and packing in order to remain steam-tight should possess some elasticity and move slightly at every stroke of the valve.

The style of packing illustrated has not been very extensively introduced as yet, but has, we understand, given such satisfactory results on the Chicago & Northwestern, where it is applied to a large number of engines, that the Pittsburgh, Cincinnati & St. Louis and several other roads have lately given trial orders, and it is also used on marine engines, on the lakes, on steam hammers and on the great Corliss engine at Pullman.

Any further information may be obtained from Mr. J. A. Sleeper, 18 South Canal street, Chicago.

Brake Test Apparatus.

The cuts in this issue of the apparatus used in brake trials on the Berlin Stadtbahn (Elevated Railroad), and of a form of apparatus proposed by Mr. Albert Kapteyn for similar trials, will be of interest to our readers in view of the approaching Burlington brake tests.

The apparatus used on the Berlin Stadtbahn consists of two pencils bearing on a strip of paper moved by clock work, or by hand if preferred. One pencil, actuated by a clock escapement, which makes and breaks an electric circuit, gives long marks like the ordinary ones of a Morse instrument, the space from the end of one to the corresponding end of the next one representing one second. The second pencil gives the wheel revolutions in the same period by a set of shorter marks parallel with the others. The latter pencil is actuated by reverse currents sent by means of the brushes *E E*, which remain in constant contact with a metal ring on the axle or with the axle itself, and by the alternate contact of the brushes *B* and *B*₁, with a metal segment fastened to the same axis. The other portion of the circumference in which the segment is filled out by wood. Exactly why the two brushes *B*, *B*₁ are needed does not appear, as it would seem sufficient to replace one by a spring. The car with the apparatus was always placed in the middle of the train. It was provided with an escape valve for the brake pipes and a pressure gauge. The greatest number of cars used was 16, with which, as with similar numbers in the Burlington tests, no serious shocks were felt. The brake used was the Carpenter automatic air brake, which has been extensively adopted in Germany.

The experimenter on the Berlin Stadtbahn, instead of noting the application of the brakes on the recording strip by an agreed or automatic signal from the engine, tried to deduce this by some elaborate calculations, based upon an assumption that after a certain lapse of time the velocity curve will show a nearly straight line, which will then represent a constant retardation. He is naturally somewhat bothered in finding where this constant retardation begins, and finally admits that the difficulty is possibly to be found partially in an increase of the brake friction at low velocities. The experimenter is very anxious lest, in obtaining a brake capable of making very rapid stops, the ordinary operation of the same may have unpleasant effects for the passengers. He also recommends the use of driver brakes, because it will be a long time before even half the vehicles running can be provided with continuous brakes.

All German railroads are not so unsentient as to build up a large edifice of formulas on such a miserably defective foundation of fact as this observer, and a later number of *Glaser's Annalen* contains a complete demolition of the experimenter's conclusions by Mr. Albert Kapteyn, the inventor of the apparatus shown by figs. 2 and 3, showing the folly of trying to ascertain the merits of one kind of brakes by formulas deduced from observations upon another kind.

Mr. Kapteyn's apparatus is designed to record accurately the moment of turning on and turning off the air, the length of time occupied by the experiment, and the brake pressure at any given moment.

It consists of a clock escapement enclosed in the box *U*, fig. 3, and turning the drum *T*, around which is rolled the dia-

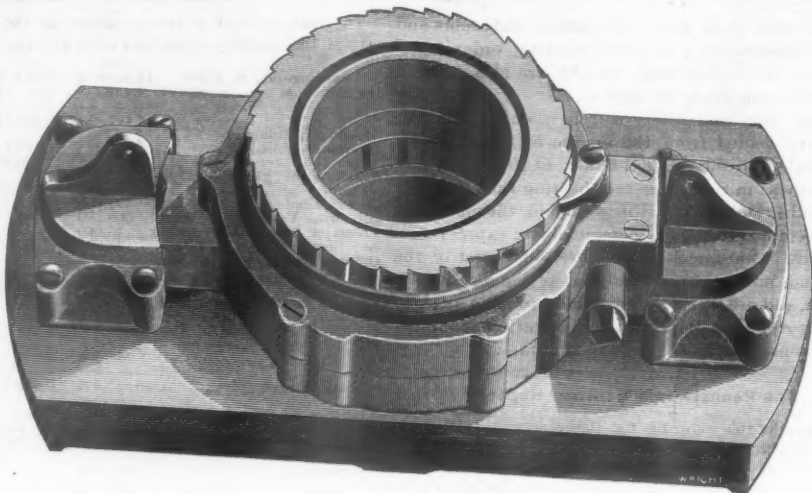


Fig. 1.

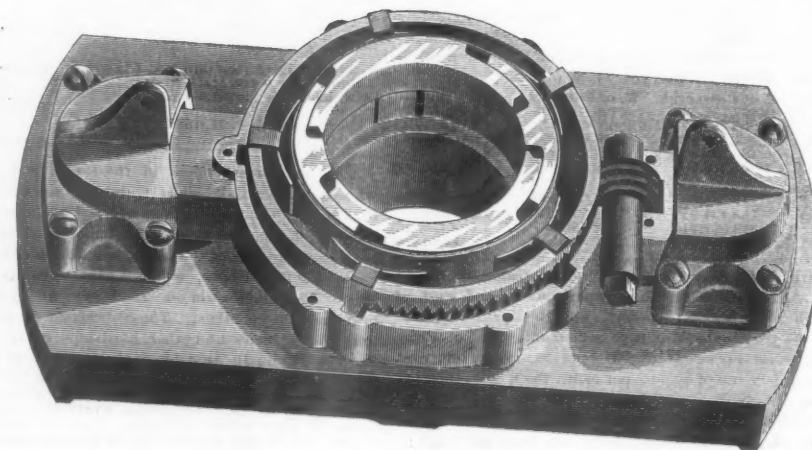


Fig. 2.

SLEEPER'S PISTON-ROD PACKING.

gram paper. Since this escapement is liable to give, particularly in starting, a movement not exactly uniform, a further disposition is necessary to secure exactness in time measurement, which is described below.

By means of a Richards indicator *D*, fig. 3, the pressure in the brake cylinders is registered by the pencil *O*, upon the drum cylinder, as shown by the diagram *A B C E F G*, figs. 2 and 3. Below the pencil *O*, and in the same vertical plane, another pencil *I* is alternately raised and depressed for an interval of one second by a magnet governed by a clock move-

In order to start the drum *T*, the handle *V* on the right-hand side of fig. 3 must be raised either by hand or by the magnet *3* above the indicator. This magnet is in the same circuit as the pencil *2*, and in order that the drum may get under full headway before the record begins, the button *Q* shown at the top of the diagram on the left is placed in the engine cab. Once raised, the handle *V* remains up until depressed by hand.

When the runner is about to put on the air he presses the button *Q* which starts the drum, and at the same time rings a bell *Z* in the observation car, which bell, of course, rings also during the whole time that the air is on.

Examining the lines on the diagram, fig. 2, we see that the air began to go on in the brake cylinder $3\frac{1}{2}$ seconds after the valve was opened. At the end of 5 seconds the air was at half maximum pressure. In $6\frac{1}{4}$ seconds it was full on. Proceeding along the diagram and comparing the line *P* with the point *E*, where the pressure began to decrease, we see that the latter was 5 seconds behind the shutting off of the air. In $8\frac{1}{2}$ seconds the air was half off, and in $19\frac{1}{4}$ seconds the brakes were free.

An additional electro-magnet recording on the same drum the number of revolutions of the axle would give a very complete record of the efficiency of a given brake in stopping a train. Its smoothness of action would remain to be determined by the slide gauge used in the Burlington experiments.

TECHNICAL.

Locomotive Building.

The Fitchburg Railroad is having built by the Taunton, Mass. locomotive works five 22 by 24 in. consolidated engines, five 18 by 24 in. moguls, and one 17 by 24 in. switcher.

The Franklin & Megantic railroad company is using a new engine built by the Baldwin Locomotive Works.

The Car Shops.

The Buffalo, Rochester & Pittsburgh has ordered 300 box cars from the Lafayette Car Works, Lafayette, Ind., and 200 coal cars from the Buffalo Car Works.

The Wason Manufacturing Co., Springfield, Mass., will add about \$10,000 worth of new machinery to their works and will build a resawing mill 125 by 45 ft., one story high. The company is building a dining car and 7 drawing rooms for South America, 4 passenger cars for the Boston & Providence, and 25 freight cars for the Connecticut River. Orders on hand amount to \$375,000.

The Jackson & Sharp Co., of Wilmington, Del., is now filling contracts as follows: 10 sleepers and 5 parlor cars for the Baltimore & Ohio; 12 day coaches for the Delaware, Lackawanna & Western; 6 coaches for the Providence & Worcester; 8 parlor cars for the Long Branch line; 16 parlor cars for the Woodruff Sleeping & Parlor Coach Co. (repairs), and 6 United States Postal cars for the Richmond & Danville railroad.

At the Jefferson (Ind.) Car Works 600 cars, thirty-four feet long, with a capacity of 50,000 pounds are being built for the Lake Shore.

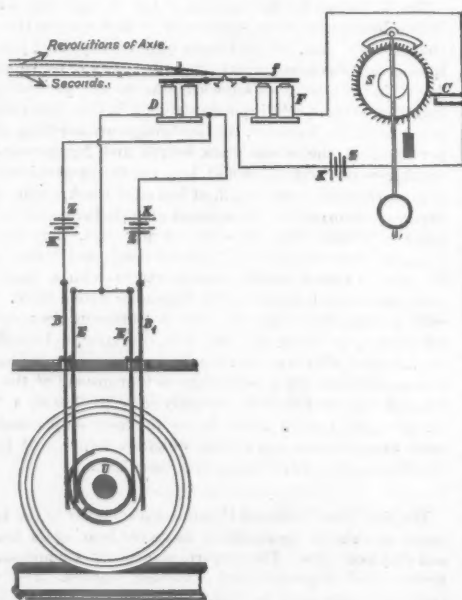


Fig. 1.

ment, producing the indented line *H L*, by which the movement of the drum is checked off and the lapse of time of any portion of the diagram determined. A third pencil *2*, fig. 3, is operated by a magnet controlled mechanically by the opening or closing of the engineer's air valve, thus recording the exact moments when the air is put on and shut off. As, however, the pencil *2* could not be conveniently placed in the same vertical plane with *O* and *I*, the points *K*, *M*, etc., on the diagram, fig. 2, must be moved by a constant distance equal in the case shown to 75.5 millimetres, to bring this part of the record into proper relation to the rest of it.

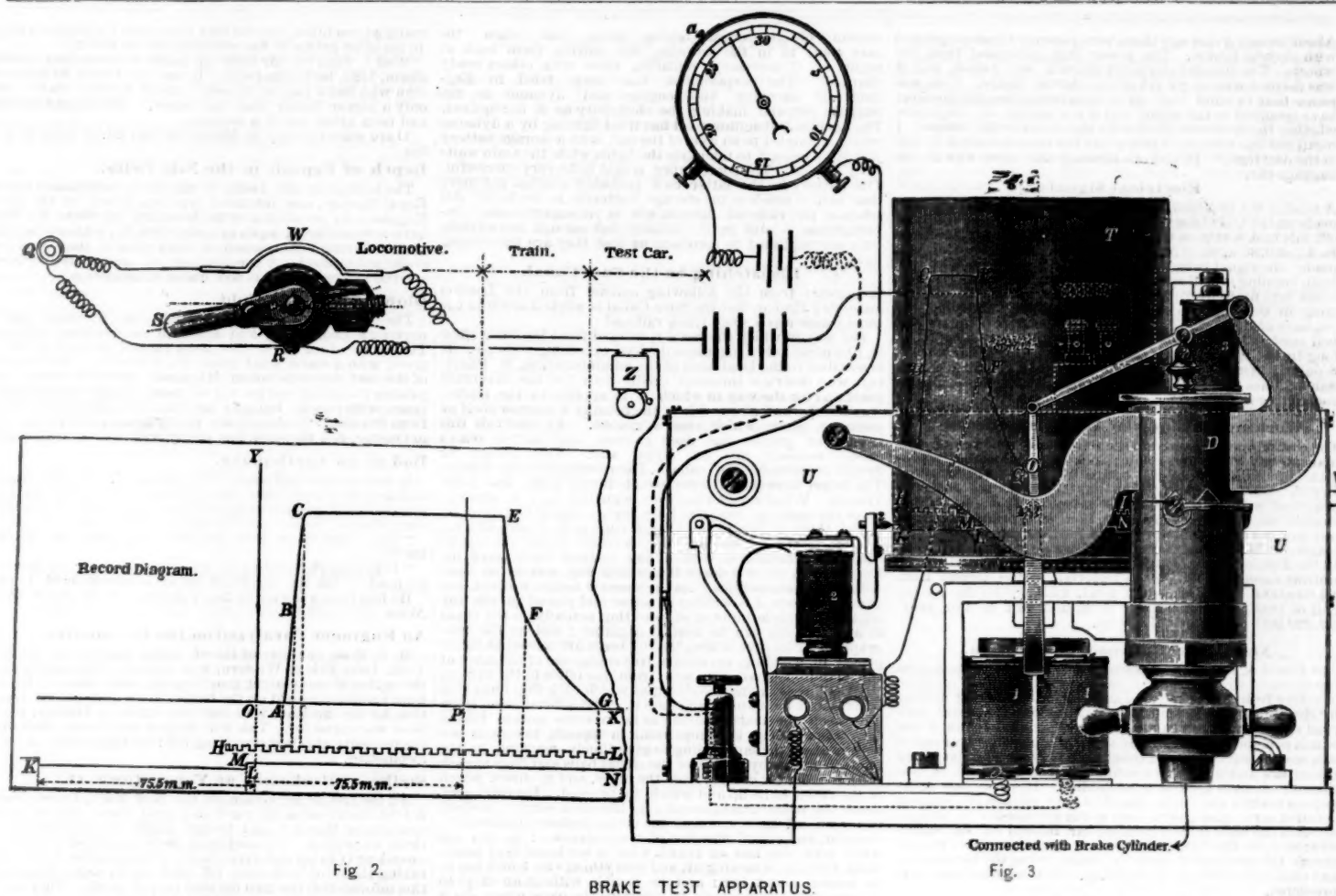


Fig. 2.

BRAKE TEST APPARATUS.

Mr. Wm. McWood, Superintendent of the Car Department of the Grand Trunk, is building a number of passenger cars at the Montreal shops, to be run on through trains between Montreal and Chicago. Some of them are combination smoking and non-smoking, the dividing partitions being in the center. The inside finish is in plain, light-colored woods. The outside is a maroon color, like that of the standard coaches of the Pennsylvania Railroad. The cars are furnished with Forney seats. In the combination cars a new departure has been taken in the location of the Baker heater. Instead of being at one end, it is placed midway between the ends, and inclosed in a zinc box or casing so secured as to prevent the fire from escaping in case of accident. Its central location also renders it less liable to be fractured in a telescoping collision. The cars are mounted on the standard trucks of the road, with 41-in. wheels.

Bridge Notes.

The Lake Shore & Michigan Southern and the Michigan will jointly build a bridge across the Rouge River, between Toledo, O., and Detroit, Mich., to replace the two old structures now in use.

Manufacturing and Business.

The Summerville Creosoting Works of Charleston, S. C. will be removed to a site on Cooper River, and the capacity of the works is to be increased.

The National Paint Works of Williamsport, Pa., are filling orders to the extent of their capacity.

The Westinghouse Electric Co., Pittsburgh, Pa., are making preparations for extensive improvements. Among the new buildings will be an eight-story brick building. With the new capacity the works will have an output of 8,000 lamps per day.

The Iven & Son Steam Engine, Steam Pump & Car Wheel Works are to be removed to Decatur, Ala.

Messrs. Miller, Metcalf & Parkin, of Pittsburgh, have discontinued their agency arrangement with Messrs. Ely & Williams, and have appointed Mr. P. H. Patriarch Manager of their Eastern department, with warehouse at 480 Pearl street, New York.

Two hundred box cars for the Chicago & West Michigan road are to be equipped with "The Cowell Freight Coupler."

The Dunham Mfg. Co., of Boston, recently received an order for their Car Door Hanger and Seal Lock from a Denmark railroad.

Iron and Steel.

The Spang Steel and Iron Co., Pittsburgh, Pa., will have their new Clapp-Griffiths steel plant ready for work by March 1. It consists of two 3-ton converters, and its capacity will be about 50,000 tons per annum.

A large steel ironing heating furnace has just been completed for the Jefferson Iron Works, Steubenville, O. The furnace contains a working hearth of 7 x 22 ft., with five doors, and has a capacity for wash-heating steel ingots of 150 tons per diem.

Ten furnaces will be ready for work in the Bessemer Steel Works at Duquesne, Pa., by March 15.

The Kingsford Foundry and Machine Works, of Oswego, N. Y., are making an addition to their boiler department. The new building will be 70 x 200 ft., giling, with the old shop, a total area of 130 x 320 ft. for this line of work.

To Pittsburgh is credited about one-third the entire output of wrought iron pipes in this country, the daily output now being 850 tons. The stocks in hand Feb. 1 were 15,000 tons.

The Birmingham Iron Bridge & Forge Company, Birmingham, Ala., is advertising for bids for erecting buildings for its works.

Messrs. Miller, Metcalf & Parkin, of Pittsburgh, Pa., have perfected arrangements for carrying a stock of steel at their warehouse, 480 Pearl street, New York.

Of the 9 first-class furnace stacks in Sharpsville (Mercer County, Pa.), 6 are now in blast, producing, in the aggregate, about 500 tons of pig metal a day, mostly high-grade Bessemer.

One of the large mills of the Allentown, Pa., Rolling Mill Company, which has been idle for six years, has resumed operations.

The Owen Car Heater.

A test of this heater (which was illustrated in the *Gazette* last week) was made in the Charlestown yard of the Fitchburg last week. The test comprised attempts to smash the heater by backing a train of platform cars against it. The heater was set on a rude platform a little lower than the draw-bar of the car, a brisk fire was lighted in it, a lot of shavings and chips was piled around it, and a big can of kerosene oil was then poured over the inflammable mass. The train was backed down upon it with considerable force, but beyond knocking it to the ground no effect was seen. The heater was not broken, and no coals or fire were thrown out. It is claimed that there are many advantages in heating cars with stoves in each one, and that heaters like the one tested yesterday are perfectly safe, as no coals can by any possibility get out, and with the hottest fire the outside is not warm enough to burn one's hands.

A New Car-Heating Device.

H. Clay Dennis, a house and sign painter of Tyrone, Pa., has invented a car-heating apparatus, by which, he claims, a current of pure heated air is constantly supplied to the car. The whole apparatus might be tossed and tumbled around through the car without the slightest danger of its setting anything on fire. His appliances consist of a double 1/4-inch wrought-iron casing encircling any approved pattern stove, having air chambers at the top and at the bottom of the stove. The air is taken from the bottom of the car, passes through a lower chamber, thence through a gate-shaped register, and, after being heated, passes out of another register on the opposite side into the car, never once coming in direct contact with the stove. The entire casing is but six inches wider than the stove it encircles. The door of the casing is provided with a double bolted spring lock, and when closed the door is as secure as any other part.

The Martin Steam Car Heater.

An official test was made of this apparatus (which has been already illustrated in the *Gazette*) upon the Chicago, Milwaukee & St. Paul, at St. Paul, on the 24th ult. The heater was applied to a local train running between St. Paul and Minneapolis. The test was witnessed by a large number of railroad officers, and was considered to be very satisfactory. With the thermometer outside standing at zero, the car was kept at 80 deg., with a pressure of steam of 6 lbs. per sq. in. The train will run regularly, and another test will be made whenever a cold snap sets in.

The Machine Shops.

Messrs. Gould & Eberhardt, of Newark, N. J., have recently booked orders for their Automatic Gear Cutters (which are entirely automatic) from Potter Printing Press Co., Plainfield, N. J. (two machines); Brown Cotton Gin Co., New London, Conn.; Weed Sewing Machine Co., Hartford, Conn.; American Sewing Machine Co., Philadelphia, Pa.; Willets Manufacturing Co., Providence, R. I.; and Stiles & Parker Press Co., Middletown, Conn. Sir William Armstrong, of England, recently received a 84 in. machine which is capable of cutting 2 1/2 in. circular pitch in forged steel, 2 in. face with two cutters at one cut. Nearly one hundred of these machines are in successful use in Spain, France, Switzerland, Germany, England and other countries.

Emerson Heater.

The Emerson heater was exhibited on the Connecticut River road Feb. 25, for the inspection of the Maine railroad commissioners.

Electricity Superseding Oil.

The Consolidated and Boston & Albany roads intend to light by electricity the two fast trains leaving Boston and New York at 4.30 p. m. daily, beginning March 15. The idea is to light each train with 18 or 20 incandescent lights. It will take nine hours to use up the electricity stored for one

run. It is expected that by another winter all cars will be heated by steam from the locomotive.

A Symposium on Car-Heating.

The *Epoch* has procured expressions of opinion on some of the devices for car-heating from several men qualified to speak with authority, which we condense.

Mr. Erastus Wiman says: "The experience we have had on Staten Island with the Gold heating system has been very satisfactory. * * * For short runs and for trains with a small number of cars it is most effective. Whether it could be made equally effective on long trains of ten or twelve cars running through cold regions is an open question which I could not pass upon. So far as our knowledge goes on Staten Island, the steam-heating plan is extremely effective, uniform, safe and easily controlled."

Mr. Wm. Buchanan, Superintendent of Motive Power and Rolling Stock, N. Y. Central R. R. Co., says: "Our road uses the Baker heater, and we only have one in a car. So far we have found that to be the best method of heating. I think, however, that the heater that was thrown off the bridge on Saturday, February 19, is a safe heater. [The Smith & Owen heater, described in the *Railroad Gazette* last week.] It is a heater to which I have given a great deal of attention and study. Heating cars by pipes from the locomotive is nothing new. I saw it tried thirty years ago. That method has never succeeded; one reason is that the steam is apt to condense and freeze in the pipes between the cars, when the locomotive or source of supply is disconnected from them."

Mr. H. S. Hayward, Superintendent of Motive Power United Railroads of New Jersey Division, Pennsylvania Railroad, says: "The Pennsylvania Railroad are equipping one train with steam heaters. They will use the steam from the engine and carry it back through the cars. It is experimental how far they will be able to carry steam with success. Three or four cars they will heat very readily. When you come to heat ten cars then you will have some difficulty. I think, however, those difficulties will be overcome by experiment. The trouble of the condensed water freezing in the pipes between the cars is provided for by automatic traps, which close when the water is released in the pipes. A Western road is using hot air on the locomotive and carried back through the cars. I do not see any serious objection to this method if the heat can be carried back as successfully as steam. You understand perfectly well that a train going at a high rate of speed exposes a very large surface to the intense cold and high winds, and there are a great many air leaks through the windows and doors. The result is, you have to provide for a great deal more heat than you would to heat the same area in a building. I think the steam-heating method will be a success, but it is like the introduction of the air-brake—put on the cars as an experiment and subsequently improved and developed so as to make a perfect system. The railroads want to get the best method. It will, for instance, cost the Vermont Central Railroad more to settle up with the sufferers in the recent accident than it would to adopt a new system of heating. Railroads will adopt the best system. I do not think that it is a question of expense with companies, but it is a question of adaptability."

Mr. A. A. Folson, Superintendent Boston & Providence Railroad, says: "This is a most important subject. It has always received the attention of railroad managers, and always will. In the present state of science and mechanic art, I know of no better way than a heater for each car. I do not believe that steam from the locomotive can ever fill the bill. The reasons for this are too numerous to mention. What is necessary for perfect safety is to banish fire of all kinds from the cars. The presence of oil, gas or candles is an element of danger, and this must be got rid of. We manufacture ice by a chemical process. Why cannot science evolve a method of heating in a similar manner? This should be done in a safe way, of course. As for light, I have no doubt that in due season we shall have a good electric light in cars, furnished by battery or storage. Here arises another question. Suppose each car contained a storage of electricity, would it be dangerous in a thunder storm?

About twenty years ago there were passenger trains equipped with electric brakes. The power was generated from the wheels. The thunder storm conundrum was raised, and it was deemed wise to get rid of the electric brake. You will please bear in mind that all of these recent terrible disasters have occurred in the night; and it is a matter of conjecture whether the fires were started by the stoves or the lamps. I recall but one instance where a car has been destroyed by fire in the day time. In this one instance the stove was in the baggage car.

Electrical Signals.

A trial of the Bickford electric railroad train signal has been made on the Old Colony road. Several prominent railroad officials took a trip on the train leaving Boston for Newport, R. I., at 9:30 a. m. A thorough trial of the system was made—the signal being “rung in” to the engineer with the train running at full speed, and a prompt stop made. Again a test was made by “cutting off” a car, when the electric gong in the engine cab immediately rung, notifying the engineer of the fact. The signal is intended to displace the bell cord, which has been found to be impracticable on long trains, the engineer failing to receive any signal when it is pulled. The invention is that of Mr. John H. Bickford, of Salem, Mass., who is the general manager of the company controlling it.

Working Expenses of English Railroads.

The cost of materials used in the repair and renewal of permanent way works and rolling stock it is calculated represents about one-fifth of the entire working expenditure of British railways. More than anything else the economy practiced, and the low level of prices of iron, etc., have enabled the companies, by reduction of working expenses last half year, to counteract diminished earnings, and so pay better dividends than they could otherwise have distributed. In the first half year of 1884 the principal English and Scotch railways spent £2,438,000 on material; in the second half, £2,638,000. The first half of 1885, £2,330,000; the second half of 1885, £2,600,000; and in the first half of this year, £2,220,000.—*Engineer* (London).

New York Railroad Commission.

The Board of Railroad Commissioners, in response to a joint resolution of the Legislature, has reported upon the question of safety from fire in railroad accidents. It finds that heating by steam from the locomotive is not feasible in general railroad service. Its recommendations are contained in a bill which prohibits the use of any stove in a passenger car unless it is so constructed and guarded as to prevent the car from taking fire under any circumstances. The use of oil of less than 300 degrees fire test is prohibited. It prescribes floorings on bridges and cattle guards strong enough to support derailed cars; also guard posts at the approaches to bridges to catch the blow from a derailed car instead of the superstructure of the bridge itself. A minority report recommends the heating of cars by steam from the locomotive, and objects to kerosene for lighting. Bills to these ends are presented.

Car Heating by Warm Air.

Among the plans which the ingenuity of inventors has devised for car-heating since the frightful calamities of this winter have brought the matter into prominence is one invented by Mr. Lewis B. White, and controlled by Barrows & Co., of 64 Broadway, N. Y. His patent embraces the introduction of air at the very front end of the locomotive and its circulation through a coil of pipes in the smoke-box extension, and around the smoke stack and boiler, inside the jacket of the latter. The air is then conducted by a pipe of proper size from the engine to the train, accelerated by a blower at the rear of the tank.

The merit claimed for the plan is the utilization of the waste heat of the locomotive and the supply of perfectly pure air to the train. The details do not appear to have been very fully studied, and it is to be apprehended that the coil of pipes in the smoke-box extension would prove troublesome by clogging up the cinder, and that the large sized couplings required between the engine and cars would be troublesome to manipulate and keep in order. The loss of heat to the engine would probably be as great if not greater by this method than by the direct use of steam, although this would be offset if the scheme be found practicable by the excellent quality of the ventilation under such a scheme. It is further liable much more than the steam heating plans to the objection that its action would be interfered with in a snow blockade by the choking up of the inlets, and on grades by the suspension of the blower in order to save all the power of the engine for its work.

Electric Lighting for Trains.

G. W. Blodgett, electrician of the Boston & Albany road, interviewed by the *Springfield Republican*, says: Electricity is the coming light for railroad cars, because it is clear and steady, does not vitiate the air, and above all, cannot set anything on fire. The difficulties pertain to the “life” of a battery subjected to such hard usage, its considerable weight, the necessity for the daily recharging process, which takes up much time, and, possibly, what may give trouble, the fact that you can never judge by the looks of a battery, nor by any test, how much electricity is in it. When you charge it you know when it is full, but if it has been used you can never judge how much. The storage battery is the most practicable means of lighting.

The Pennsylvania road in certain experiments used batteries weighing 2,000 pounds for each car, and the system cost no more than gas for the same purpose. They are now experimenting with the Julian system, which has also been tried, for two weeks past, in the “Newton circuit” of the Boston & Albany road, and out to South Framingham. The battery weighs 1,400 pounds for each car, and supplies electricity for 6½ hours’ use. The Julian does not furnish a better light than the Brush, but being designed for the rough use of a railroad is expected to last longer. The plates are an alloy of lead and other metals, somewhat stiffer than the old-style plates of pure lead, and are cast in the form of a network containing the active material in its interstices, so that the plate itself is not much acted on by the acids. The fault of the old plate is that it disintegrates by the repeated process of charging and recharging, and falls to pieces. Neither these batteries nor any others have been used on railroads long enough to show what their actual life is. Stationary storage batteries, when properly cared for, last two, three or sometimes five years in good condition. The conditions of car lighting are different. The constant jarring tends to interfere with the stability of the plates, but this difficulty the Julian battery company claims to have overcome, and so also do the Electrical accumulator company of New York, whose contrivance is somewhat similar. The Julian system has been tested in horse cars in Brussels, and more lately in New York and elsewhere, with good results so far as I know. It made a good showing, too, at the Antwerp exhibition in 1885.

“Storage batteries weigh from 1,400 to 2,000 pounds,” Mr. Blodgett continued, “according to the number of cells, but I don’t consider that a very serious difficulty. Much more serious is the fact that they have to be charged every day, and the process takes just about the time they are to be used. If a battery is to furnish light for 10 hours it requires 10 hours for charging. It is proposed to use a change

system of batteries, taking them out when the cars come in in the morning, and putting them back at night, or, if necessary, replacing them with others ready charged. The experiment has been tried in England of carrying the engine and dynamo in the baggage car, and making the electricity as it is required. The London & Brighton road has tried lighting by a dynamo which is coupled to an axle of the car, with a storage battery just large enough to maintain the lights while the train waits at a station. The contrivance is said to be very successful. The battery in the latter case probably weighed not more than half as much as the storage batteries in use here. All schemes for railroad lighting are as yet experimental; investigation is still in its infancy, but enough has already been accomplished to convince us that they are the coming light.”

Dispatching on the Suez Canal.

It appears from the following extract from the London *Saturday Review* that the Suez Canal is worked much in the same manner as a single track railroad:

The way in which the canal is worked from the Suez office is, like many other ingenious devices, exceedingly simple. It is ascribed to the local head of the administration, M. Chartrey, who deserves immense credit both for the invention itself and for the way in which it is applied to the traffic. Against the wall at one side of the room is a narrow shelf or platform, along which runs a groove. At intervals this trough or groove has deep recesses, and at two places these recesses are of larger size. This trough or groove represents the canal. The recesses are the sidings. The larger intervals are the Great Bitter Lake and Lake Timah. When a vessel has been signalled and is about to enter the canal at, say, the Suez end, a small toy boat or model, three or four inches long, is chosen to represent her. A group of these model ships stands ready beside the model canal, each furnished with a flag. About forty have the English flag, ten or a dozen the French flag, and so on with other nationalities. As the steamer comes up and her name is known, it is written on paper and placed on the toy boat. The whole number of ships thus actually in the canal at any moment can be seen at a glance; and as the telegraphic signals give notice, the toy boats are moved along, or placed in a siding, or shown traversing one of the lakes at full speed. Signals are sent from the office to the various “gares” prescribing the siding at which each ship must stop to let another ship meet and pass it. The official who is on duty keeps the models moving as he receives notice, taking care when perhaps two ships going in opposite directions are both nearing the same siding to give timely warning to the pilots in charge by means of the signal balls and flags at each station under his control from the office, and to direct which of the two is to lie up and which to proceed. Barring accidents, the whole arrangement goes like clock-work; the clerk can read off in a moment the name, tonnage, nationality, draught, and actual situation of every steamer; he can tell what pilot she has on board, what is her breadth of beam, what rate she is moving at, and everything else which has to be known about her; and he is able without an effort to govern all her movements, to prescribe the place where she is to pass the night, and the hour at which she is to get under way in the morning, although he does not see her, and probably never saw her in his life.

The Sewall Heater.

A trial of the Sewall system of heating cars from the locomotive was held at Portland, Me., Feb. 28. The train consisting of 8 cars was made up at Portland, the run being from there to South Gardiner and return. Among the party were Messrs. Anderson, Wiles and Morton, Railroad Commissioners of Maine; Messrs. Kinsley, Crocker and Stevens, Massachusetts Railroad Commissioners; Mr. J. H. French, Superintendent of the Old Colony; Mr. J. T. Furber, Superintendent of the Boston & Maine; Mr. John Adams, Superintendent; Mr. J. W. Marden, Master Car-Builder; Mr. O. Stewart, Superintendent of Motive Power of the Fitchburg, and Mr. George Richards, Master Mechanic of the Boston & Providence road.

These gentlemen were well pleased with the result of the trial and it seemed to be the general opinion that with one or two slight changes the Sewall heater could be applicable to Boston roads.

THE SCRAP HEAP.

Jolly Days and Auspicious Nights.

The past week was blizzardous in its tendency. The wind just blew all over the lot, and the soft, white, pretty snow swept and swirled like mad, burying big railroad trains as though they were children’s toys. Despatches from Saratoga, N. Y.; Lewiston, Me.; St. Johnsbury, Vt.; Montreal, Canada, and Bismarck, Dak., all tried to tell the most startling story. There were more stalled trains lying around the country than would keep an imaginary Kansas road in rolling stock for the next 90 years. People camped out at way-stations waiting for trains that were four days late. Snow-ploughs were sent out in several instances, but they simply ploughed themselves, by a tremendous struggle, to a certain solid, immovable point, and then waited for another snow-plough to come up and be company with them. Altogether, last week was a very fine week to pass near one’s own fire-side. Railroad cars were not elysiums on wheels. Any one who has gazed, with his stomach empty, through the frosty window of a Pullman out over a billow-sea of cold, pulseless snow can appreciate the intrinsic worth of last week’s blizzards.

The Horrors of a Night; a true Story.

All was bright, kerosene-lit gayety on the Boston express that left New York at 10:30 p. m. on Thursday of last week. The grumbling tunnel had just been left behind and the train had settled down to its night’s work with a steady, rhythmic quiver. The conductor had finished his first round, and had snipped every one’s ticket with the air of a monarch. The train-boy was whistling “Mulberry Springs” out on the widdy platform, and the inevitable fat man was getting in his crescendo snore down near the innocent but much-abused stove. Enter tall, elegant bunco-steerer. His eyes and his diamond pin flash over the situation and bathe in a beneficent radiance a young man from Maine.

“Ah! Good evening, G.ing far?” Just then a rough, uncouth, woefully inebriated individual justled against the tall elegant bunco-steerer.

“Skuze, hic, me, shir. M’ drunk, but m’ loaded, hic, with boodle, an’ I play you just one qui’ ill game whish, hic, for twen’y doll’s.”

“I’ll go you,” replied the t. e. b. s., and he “went” him, while the young man from Maine felt his mouth water to see the agility with which the inebriated individual lost his money.

“By gum, I b’leeve I’ll try my hand, an’ see ef I caant win some uv that drunkard sinner’s money.”

Dye see! It was the same old game. Young man from Maine didn’t win the drunkard sinner’s money. Drunkard sinner won the young man from Maine’s money.

Hardly had the tears of the Maine youth evaporated when the train struck a man who was walking on the railroad track. According to the conventionally exciting dispatches of the daily press, the man struck was wheeled away in a

mangled condition, but the fact is he wasn’t scratched enough to make an excuse to his wife that the cat did it.

Well! Then the car blew up amid screams and sizzling steam, biffs, booms and abs. It was hard work to make the man who had a pair of trousers ruined believe that it was only a steam heater that had burst. He thought the plug had been taken out of a volcano.

There was evidently no Mascot on that 10:30 train to Boston.

Depth of Deposit in the Nile Delta.

The borings in the Delta of the Nile, undertaken by the Royal Society, and intrusted to a detachment of the Royal Engineers by permission of the Secretary of State for War, have now reached a depth of nearly 200 ft., without the solid bottom having been reached, a depth greater than was generally anticipated. A consignment of specimens has lately arrived in London and is now under examination.

Blowing Hot and Cold.

The “Chinook” wind has struck into Montana and is proving a great boon and relief to the live-stock interests. The temperature early this week ranged from 40 to 50 degrees, with a warm wind from the southwest. But nothing of this sort prevails out in Minnesota and Wisconsin. Dispatches from that section tell of temperatures unequalled in years, with people burning up their household gods to keep from freezing. Railroads are pretty much obliterated. Up in Quebec, too, the snow has pretty well cancelled all trains.

Bad as an Earthquake.

It was up near Jefferson City, Missouri. A tall, ragged and anxious looking man, having some clothes tied up in a handkerchief, was hurrying along in the middle of the highway, when a farmer called to him over the fence:

“Hey! Has there been another earthquake in Charleston?”

“Like enough,” replied the traveler without even turning his head—“but the one which hit me occurred in St. Louis.”

He had been a holder of fancy stocks.—*Wall Street Daily News.*

An Engineer Paralyzed on His Locomotive.

M. L. Rose, engineer of the St. Louis express on the New York, Lake Erie & Western, was stricken with paralysis on the engine Monday night near Deposit, and found with his head leaning forward on the boiler, in an unconscious condition, by the fireman, who ran the train to Deposit, where Rose was cared for. This will suggest to bucolic statesmen the necessity of a law providing for two engineers on each locomotive.

Strike of Brakemen at Youngstown, O.

All the freight brakemen on the New York, Pennsylvania & Ohio Railroad of the yard and road crews struck on the morning of March 2, and freight traffic at that point is entirely suspended. The employees were informed that Superintendent O’Brien had given instructions to enforce the order taking the third brakeman off each crew, and acting upon this information the men decided to quit work. They assert that when the strike was settled last fall it was agreed that each crew should have three brakemen.

Kingsley was Wrong.

The late William C. Kingsley, early identified with the Brooklyn Bridge, predicted that its utmost capacity for accommodating travel would be reached early in the next century, when it would be used by 36,000,000 people per annum. His calculations have been so far exceeded by the fact that in 1886, or 14 years before the conclusion of the century, the number of persons who crossed the bridge reached the aggregate of 27,436,707, and at the past rate of increase of the traffic, the present maximum carrying capacity will be reached before 1890.—*Iron Age.*

The Ameer is Growing Bald.

The new Transcaspian railway built by Russia is carrying the blessings of civilization to the East. Already the Ameer of Bokhara and his subjects are enjoying the performances of a large corps de ballet imported from Moscow.—*Exchange.*

N. Y. & N. E. 195 7-8.

In the rotunda of the Astor House, New York City, is a neat and highly finished model of engine 45, of the New York & New England road, labeled “limited express.” It is about 3 ft. long and is mostly silver or nickel-plated, and appears to be a working model, the driving wheels being “jacked up” so that upon dropping a five cent piece (a counterfeit will answer, apparently), into an aperture in the case, they begin to revolve and continue to run for about two minutes, during which a music box in the base is kept playing and a diminutive incandescent electric lamp in the headlight is kept shining. A card announces the W. T. Smith Mfg. Co., of Providence, R. I., as the makers of this latest device for extorting money from the public without lacerating their feelings, and says that the Messrs. Smith are so benevolently inclined that they will make models of this kind for roads without money and without price, the whole dependence for profits being the voluntary contributions of the curious in hotels, etc., where the models are placed. Quite likely we have here a valuable suggestion in the line of recouping the prospective losses incident to compliance with the Inter-state Commerce bill. A road with, say, 500 engines could go to Mr. Smith, and in consideration of a large order compel him to divide the profits, and very soon get funds together sufficient to build an extension to Kansas City. Algebraically it would appear thus:

Five hundred hotels × 1,000 guests per day = 500,000, at 5 cts. per guest, \$25,000. Make the hotels pay \$50 per day rent in consideration of the added custom they would receive and the total is doubled, \$50,000. The cost of the models would be, say, \$25 each, and allowing the aforesaid Smith 20 per cent. profit, fair for a private individual who has no general office expenses, advertising or legislative outgoes, or receivers’ charges looming up in the future, and we have \$35,000 per day as the net result. With this new engine could be constantly added and the hotels of the world flooded with models, in a very short time swelling income to a point where dining cars could be afforded on every train and an officer’s car provided for every section master. There can be no question that the way to transfer money from the pockets of the public to the coffers of a railroad, and do it smoothly and successfully, is to take the aforesaid public when he is away from home on a spending excursion and to never demand more than a trifling amount at any one time.

Nonvollient Actusity Brought to Bear on a Throttle.

A letter from Scranton, Pa., Feb. 15, says: Late Saturday night, Dennis Mack, engineer on a switch engine in the yards of the Lackawanna Iron and Coal Company in this city, ran his engine into the engine house. As he was to go on duty again at 1 o’clock Sunday morning, he lay down in the cab of his engine to sleep until that time. Just before 1 o’clock workmen in the yard were startled by a great crash at the engine house, which is a frame building. Looking in the direction of the house, they saw one side of it give way, and Mack’s engine come tearing out of the breach. The engine ran a short distance over the ground, and then toppled over.

down an embankment 20 feet high. Mack, although held so that it took the men some time to extricate him, was found to have received but a few slight injuries. He could not explain what caused the engine to start, but it is supposed that he started up in his sleep and pulled the throttle open.—N. Y. Sun.

The Coal Movement in Virginia.

"Ephraim, does de good book say dat we are made ob de dust?" "Yes, Augustus, yes, sah; and dat we must return to de dust." "Yah! yah! yah! Is dat so? Well, den, I guess it must be coal dust."—Harper's Bazar.

Coke Workers Will Arbitrate.

At a conference between representatives of the Connellsville, Pa., coke workers, and the coke syndicate, held on March 1, in Pittsburgh, Pa., it was decided to settle the wage question by arbitration. Each side is to appoint two representatives, and the four will select an umpire. In the meantime the coke works will be operated. The miners want an increase of 20 per cent., but the operators assert that 5 per cent. is all they can afford. By submitting the question to arbitration a general strike has been averted.

An Engine Older than Christopher Columbus.

The Ludlow Manufacturing Co., of Ludlow, Mass., has in its yard a switching engine which must be from the descriptions, as amusing as A. Ward's kangaroo. It is described as "aboriginal" and as having "more tricks than a mule." It consists of a "wood-shed placed on a hand-car, and has the boiler and engine inside with the smoke-stack sticking through the roof. It not infrequently crashes into the depot somewhat to its own detriment, or jumps the track with the bound of an antelope, or bursts a pipe, which gives the engineer an impression that the boiler has exploded."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Missouri Pacific, annual meeting, at the office in St. Louis, March 8.
Brunswick & Western, annual meeting, at the office in Brunswick, Ga., March 9.
Atlanta & Charlotte Air Line, meeting, at the office, New York, March 9.
St. Louis, Iron Mountain & Southern, annual meeting, at the office in St. Louis, Mo., March 8.
New Orleans & Northeastern, annual meeting, at the office in New Orleans, La., March 7.
Louisville, New Albany & Chicago, annual meeting, at the office in New York, March 9.
Bedford & Bloomfield, annual meeting, at the office of the Louisville, New Albany & Chicago, New York, March 9.
Orleans, Pauli & Jasper, annual meeting, at the office of the Louisville, New Albany & Chicago, New York, March 9.
Chicago, St. Louis & Pittsburgh, annual meeting, at the office, Indianapolis, Ind., March 16.
Kansas City, St. Louis & Chicago, annual meeting, at the office, St. Louis, Mo., March 8.
Punama, annual meeting, at the office, New York, April 4.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Camden & Atlantic, 3 per cent. on preferred stock, payable April 1.
Chicago & Northwestern, 1½ per cent., quarterly, on preferred stock, payable March 23.
Cincinnati, Indianapolis, St. Louis & Chicago, 1½ per cent., quarterly, payable March 15.
Delaware & Hudson Canal Co., 1½ per cent., quarterly, payable March 15.
Eastern, 3 per cent. on preferred stock, payable March 15.
West Jersey, 3 per cent., semi-annual, payable, March 15.
West Jersey & Atlantic, 2½ per cent., semi-annual, payable March 15.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *National Association of General Passenger and Ticket Agents* will hold its half-yearly convention in Washington, on Tuesday, March 15.
The *General Time Convention* will hold its spring meeting in New York City, on Wednesday, April 13.
The *Car Accountants' Association* will hold its annual convention in Atlanta, Ga., beginning on Tuesday, April 19.
The *Master Car-Builders' Club* holds its regular meetings at the rooms, No. 113 Liberty street, New York, on the third Thursday in each month.
The *New England Railroad Club* holds its regular meetings at its rooms in the Boston & Albany passenger station in Boston, on the second Wednesday of each month.
The *Western Railway Club* holds its regular meetings at its rooms in Chicago on the third Wednesday in each month.
The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.
The *Association of North American Railroad Superintendents* will hold a meeting at the Hotel Brunswick, N. Y., on April 12.

Trunk Line Passenger Agents.

Mr. S. F. Pierson, of New York, Assistant Commissioner of the Trunk Line Passenger Pool, visited Boston last week and met there the New England representatives of the trunk lines. It was a well attended and interesting meeting, but like the generality of these events for which the interstate commerce bill is responsible, it was totally barren of practical results. There was the usual disagreement all round regarding the question of differential rates from Boston. Commissioner Pierson returned to New York without being able to get the different roads to agree upon anything.

Southwestern, Western and Northwestern Passenger Associations.

The General Managers of the various railroads in the above association held a meeting in Chicago on March 2, upon the recommendations of the General Passenger Agents, regarding the application of the Interstate Commerce Law to passenger traffic. Anything to be done in this regard must be decided upon at future meetings, for nothing transpired at this.

American Society of Civil Engineers.

A meeting of American Society of Civil Engineers was held on Wednesday, March 2, 1887, at 20 o'clock (8 p. m.). Ballots for membership were canvassed and business transacted. A paper by William Metcalf, M. Am. Society C. E., on "Steel; some of its properties; its use in structures and in heavy guns," was read by the author and the subject discussed.

ELECTIONS AND APPOINTMENTS.

Amoret & Southwestern.—The directors are: Gov. T. A. Osborn, Hon. P. I. Bonebrake and C. S. Glead, of Topeka, Kan.; J. K. Brugler, F. J. Tynd and J. C. Clark, of Butler, Mo.; A. A. J. Park, Virginia, Mo.; A. M. Gailey, of Amoret, Mo.

Baltimore & Ohio.—Mr. Charles O. Scull has been appointed Assistant General Passenger Agent, with office at Baltimore, Md.

Buffalo, Rochester & Pittsburgh.—John White has been appointed to the newly established position of Relief Agent, with headquarters at Bradford, Pa.

Camden & Atlantic.—At the annual meeting in Camden, N. J., the following board of directors was elected: William L. Elkins, George B. Roberts, Henry D. Welsh, Joseph N. DuBarry, Thomas H. Dudley, Richard D. Barclay, William C. Houston, William Bettie, Edmund E. Read, William C. Dayton, Crawford Miller, Enoch A. Doughty, John B. Hay, George B. Roberts was elected President; D. M. Zimmerman, Secretary, and William Taylor, Treasurer.

Canadian Pacific.—Mr. E. V. Skinner has been appointed General Eastern Agent, with headquarters in New York. His district will comprise the states of New York, New Jersey, Pennsylvania and Connecticut.

Central, of Georgia.—Mr. M. S. Belknap, General Superintendent, has been made General Manager of the entire system.

Central, of New Jersey.—Mr. J. R. Maxwell has been elected a director in place of R. S. Hays.

Chicago, Burlington & Quincy.—Mr. E. M. Herr has been appointed Acting Superintendent of Telegraphs, and Mr. F. W. Sargent is promoted to be Engineer of Tests, vice Mr. Herr.

Chicago & Iowa.—Mr. C. F. Holcomb has been appointed General Ticket Agent, vice Mr. L. Ettinger, resigned.

Chicago, Rock Island & Pacific.—Mr. J. A. Sheppard has been appointed Southeastern Passenger Agent, with headquarters at Chicago, in place of Mr. Perry Griffin, resigned.

Cincinnati, Hamilton & Dayton.—Mr. H. Pierce has been appointed Engineer of Maintenance of Way.

Cleveland, Akron & Columbus.—Mr. James Harrington has been appointed Chief Engineer, with headquarters at Akron, O.

Cleveland, Columbus, Cincinnati & Indianapolis.—At the annual meeting held in Cleveland, O., on March 2, the following directors were elected: Stevenson Burke, T. P. Handy, James Barnett, of Cleveland, and James D. Layng, of New York. James D. Layng was elected President.

Detroit, Charlevoix & Escanaba.—The directors have elected R. M. Cherrie President, Arthur A. Bleasby Vice-President.

Flagstaff & Grand Canyon.—Mr. John S. Morris is President; D. M. Riordan, Treasurer. Office at Flagstaff, Ariz.

Frederick & Pennsylvania Line.—At the annual meeting the old board was re-elected, six to represent the stockholders and five the city of Frederick, Md. The board re-elected Charles E. Trail, President; John S. Leib, Treasurer; Stephen W. White, Secretary.

Hancock & Calumet.—The directors are: Henry S. Ives, Christopher Meyer, George C. Stayner and W. C. Boone. Officers: H. C. Ives, President; Christopher Meyer, Vice-President; H. S. Ogden, Secretary and Treasurer.

Housatonic.—Three directors of the board elected at the recent annual meeting have resigned and W. H. Stevenson, of Bridgeport, Conn.; W. H. Starbuck and J. L. McCauley, of New York; have been elected in their places. Officers elected were W. H. Barnum, President; C. K. Averill, Secretary and Treasurer.

Lake Erie & Western.—Mr. William A. Wildhach has been appointed Auditor.

Lake Shore & Michigan Southern.—Mr. J. S. Graham, Master Mechanic of the Buffalo division, has been transferred to a like position on the Erie division, in place of L. O. Gassett, resigned. John Robinson has been appointed to the position left vacant by Mr. Graham.

Lehigh & Wilkesbarre Coal Co.—At the annual meeting the election resulted as follows: President, William H. Tillinghast; Directors, H. S. Little, John Keen, B. Williamson, G. R. McKenzil, W. L. Skidmore, and J. R. Maxwell.

Memphis, Trinidad & Fueblo.—The officers are: W. L. Brown, Greensburg, Kan., President; George Stone, Denver, Col., Vice-President; E. W. Beerson, Greensburg, Secretary; W. H. Hunkle, Greensburg, Treasurer; H. Spidel, Rock Island, Ill., Chief Engineer.

Minnesota & Northwestern.—Mr. William Patterson has been appointed Master Car-Building, with office at St. Paul, Minn. He will have direct charge of all the company's rolling stock other than locomotives.

Mississippi River.—The directors are: S. S. H. Clark, D. S. H. Smith, Thos. J. Portis, S. D. Barlow, G. C. Smith, C. G. Warner, E. C. Merriam.

New York Central & Hudson River.—Mr. C. H. Ewings has been appointed Car Accountant in place of Mr. J. W. Carter, resigned.

Mr. J. E. Burroughs has been appointed Traveling Agent, with headquarters at Buffalo, N. Y.

New York Railroad Commission.—Governor Hill has nominated James Arkell, of Canajoharie, for Railroad Commissioner in place of John O'Donnell, whose term has expired.

Norfolk & Western.—Mr. W. H. McDowell has been appointed Treasurer. He will continue to act as Comptroller of the company.

Northern Central.—The election for directors at the annual meeting in Baltimore resulted as follows: George B. Roberts, Wistar Morris, George Small, J. N. Hutchinson, Dell Nobbit, Edmund Smith, B. F. Newcomer, John P. Green, Henry Gilbert, Harry Walters, Henry James, and J. N. Dubarry.

Then Mr. George B. Roberts was elected President; Mr. A. J. Cassatt was elected director in his stead; Frank Thompson, Vice-President; S. W. White, Secretary; J. S. Lieb, Treasurer.

Northern Pacific & Atlantic.—Among the men understood to be the incorporators of this company are Samuel Thomas and Colvis J. Bryce, owners of the Duluth, South Shore & Atlantic; R. G. Hervey and Alpha Parrish of the St. Lawrence River bridge and road, from Brockville, Ont., to Sault

Ste. Marie, Mich.; George Warren Smith; Austin Corbin, President of the Philadelphia & Reading; Thomas B. Fowler, President of the New York, Ontario & Western; Frank K. Pendleton, George F. Baker and H. C. Tahnestock, of the First National Bank of New York.

Omaha & Southwestern.—The directors are: O. H. Bently, Wichita, Kan.; J. M. Lewis, Lewis, Kan.; J. C. Strang and W. C. Edwards, Larned, Kan.; G. W. Nimocks, Great Bend, Kan.; C. J. Evans, Ellsworth, Kan., and J. B. Soffield, Washington.

Richmond & West Point Terminal.—Edward Lauterbach has been elected a director in place of John Wanamaker. An Executive Committee is made up of Alfred Sully, I. H. Inman, G. F. Stone, T. M. Logan, J. B. Pace, C. S. Brice, and George S. Scott.

Roadhouse & Quincy.—The first board of directors is made up of S. C. Wagener, L. Schlierbach, Charles J. White, J. C. Essick and W. T. Dobbs, all of Pana, Ill.

Savannah, Florida & Western.—At the annual meeting in Savannah, Ga., the following directors were elected: Henry B. Plant, J. H. Estill, W. S. Chisholm, H. S. Haines, M. J. O'Brien, Henry Sandford and M. K. Jesup. The directors elected H. B. Plant President; W. S. Chisholm, Vice-President; H. S. Haines, General Manager; R. B. Smith, Secretary, and J. Moultrie Lee, Treasurer.

Texas & Pacific.—The following were elected directors on March 1: Jay Gould, Isaac J. Wistar, Samuel Sloan, C. M. McGhee, Russell Sage, S. H. H. Clark, W. D. Winsor, J. E. Brown, W. C. Hall, J. B. Wright, Robert Fleming, George J. Gould, J. N. Hutchinson, A. L. Hopkins, Geo. B. Roberts, John Markoe and C. E. Satterlee.

Union Pacific.—Assistant Superintendent C. W. Kouns has been transferred from the division of the road between Council Bluffs, Ia., and Grand Island, Neb., to the division extending from Grand Island to Cheyenne, Wyo. Mr. W. A. Duell takes Mr. Kouns' old division, with headquarters at Omaha, Neb. C. E. Wartelle, Superintendent of the Wyoming division, with headquarters at Cheyenne, will also have charge of the Cheyenne & Northern branch, running from Cheyenne to Seventy-five-mile station.

Wabash, St. Louis & Pacific.—Mr. J. W. Christiancy has been appointed Traveling Passenger Agent, with headquarters at St. Louis, Mo.

Wabash, St. Louis & Western.—Seven of the board of nine directors will be A. A. Talmage, St. Louis; Charles Ridgely, Springfield, Ill.; E. T. Willis, Hartford, Conn.; R. S. Elmer, J. T. Hubbard, O. D. Ashley and J. J. Lawrence, New York.

West Jersey.—At the annual meeting in Camden, N. J., the following directors were elected: George B. Roberts, Coleman F. Leaming, Charles E. Elmer, John M. Moore, Thomas H. Dudley, George Wood, J. N. DuBarry, N. Parker, Shortridge, Edmund Smith, Henry D. Welsh, W. J. Sewell, Benjamin F. Lee, James H. Nixon. The directors elected George B. Roberts President; William J. Sewell, Vice-President, and William Taylor, Secretary and Treasurer.

West Jersey & Atlantic.—Board of Directors: George Wood, Wm. J. Sewell, Aaron Fries, Mahlon Hutchinson, Samuel G. Lewis, Benjamin F. Lee, John M. Moore, George C. Potts, Wm. S. Scull, Walter Wood, Joseph N. DuBarry, Israel G. Adams, John J. Gardner. They elected George Wood President; Wm. J. Sewell, Vice-President; Wm. Taylor, Secretary and Treasurer.

West Shore.—William Cadwell, of Chicago, Traveling Passenger Agent, has been appointed General Western Passenger Agent, to succeed Mr. C. E. Lambert, promoted.

Woodstown & Swedesborough.—At the annual meeting the stockholders elected John V. Craven, Charles E. Elmer, William F. Lippincott, John M. Moore, Joseph K. Riley, William J. Sewell, Samuel H. Weatherby, George Wood, Benjamin F. Lee. They elected William J. Sewell President and William Taylor Secretary and Treasurer.

Yankton, Sioux Falls & Nebraska.—The directors are: S. B. Coulson, G. R. Scougal, J. C. McVay, C. J. B. Harris, H. J. Campbell, A. Adler, W. S. Bowen, J. R. Hanson, W. M. Powers, L. M. Purdy, of Yankton, Dak., and Henry T. Corson and W. W. Brookings, of Sioux Falls.

PERSONAL.

—Mr. E. Holbrook, of Hartford, Conn., Division Superintendent of the New York & New England, has resigned his position.

—Andrew D. White, ex-President of Cornell University, was offered the position of Commissioner under the Interstate Commerce Bill by President Cleveland. Mr. White declined the position.

—John Jarvis Sanborn died of apoplexy at Franklin Falls, N. H., last week. He had been Roadmaster of the Boston, Concord & Montreal road for 35 years, and was largely engaged in granite quarrying. He was 67 years of age.

—Mr. J. L. Gaches has resigned the position of Assistant Train Master of the West Pennsylvania to become Superintendent of Carnegie, Phipps & Co.'s mill at Homestead, Pa. Mr. Gaches has been connected with the road for 21 years.

—Mr. W. H. Stevenson was tendered a complimentary banquet at Bridgeport, Conn., one evening last week by the employees of the New York, New Haven & Hartford road. The latter attested their regard for the retiring Superintendent by presenting him with a Jules Jurgensen watch and handsome chain.

—Mr. William O. Seymour, just nominated for Railroad Commissioner in Connecticut, is a civil engineer of 20 years' experience, and has had personal supervision of the building of 400 miles of road. For nine years he has been in the service of the New York, New Haven & Hartford. He is 52 years old.

—James Arkell, just appointed Railroad Commissioner by Governor Hill of New York, is about 55 years old, and an Englishman by birth. He is a Republican, and was a member of the last State Senate, representing the 18th District. He is a leading manufacturer of Montgomery County, N. Y., and the principal proprietor of the Albany (N. Y.) Evening Journal.

—Mr. Charles W. Rogers, lately First Vice-President of the St. Louis & San Francisco, died at South Pasadena, Cal., on Feb. 21, from bronchitis. Mr. Rogers resigned from the General Managership of the road about a year ago on account of ill-health, and went to California hoping to be benefited by the climate. He was born in Exeter, N. H., in 1834, and had been in the railroad business for 15 years.

—Mr. H. A. Cooper has tendered his resignation as Superintendent of Transportation of the New York, Pennsylvania & Ohio. He entered the service of the old Atlantic & Great

Western at Galion, O., as a telegraph operator in 1865. For 17 years he remained in the company's employ at Galion, in the capacity of Train Dispatcher, Train Master and other division positions. Four years ago he was appointed to his late position, and has since filled that office, with headquarters at Cleveland, O.

—Stacey B. Opydyke, of the New Haven & Northampton road, who was recently convicted, with Assistant Superintendent William H. Wallace, of the New York, New Haven & Hartford, for conspiracy in blacklisting Thomas F. Meany, has tendered his formal resignation to President Yeamans, President Watrous, of the New York, New Haven & Hartford, and a director of the Northampton road, says that Mr. Opydyke was asked for his resignation on the sole ground of economy, and that President Yeamans intends to fill the two positions of Presidency and Superintendence himself.

—There is a conductor on the Lake Shore & Michigan Southern who has been in the employ of that road for 40 years. Mr. Fred Avery started in with the old Erie & Kalamazoo in 1847, and has been in continuous service since. He was in charge of an engine for many years, and for standing by the company during a strike in 1857 he was given charge of a passenger train, and has acted as conductor since that time. Mr. Avery is described as "short, fat, an awfully jolly." In the long stretch of service his face has become a familiar one to thousands of railroad travelers. He says that when he started on the road he was over six feet tall, and thin, but constant shaking down of his person, incident to the movement of the train, has reduced his latitudinal aspiration and developed his longitudinal expansion.

—Rufus Blodgett, a Democrat, was elected United States Senator in a joint meeting of the New Jersey Legislature on March 2. It was the result of Republican votes being cast with the Democrats. Mr. Blodgett was born in Rochester, N. H., in 1834. He was a machinist by trade and worked at it for some years in his native state. Twenty years ago he removed to New Jersey, and went into the service of the New Jersey Southern Railroad Co. Soon afterwards he became its Superintendent. A few years ago he was made Superintendent of the New York & Long Branch, over whose tracks the Pennsylvania and the New Jersey Central roads run by mutual agreement. Mr. Blodgett has been in the New Jersey Assembly and was candidate for Governor last fall, being defeated by the present executive, R. S. Green. His residence is Long Branch, N. J.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of January:				
	1887.	1886.	Inc. or Dec.	P. c.
Atlantic & Pac.	\$170,000	\$100,000	I. 70,000	70.0
Cedar Falls & M.	8,832	9,578	D. 746	7.7
Cin., N. O. & T. P.	265,194	199,865	I. 65,329	31.0
Ala. Gt. South.	127,796	94,152	I. 33,644	35.7
N. Orl. & N. E.	69,003	62,973	I. 6,030	9.5
Vicks. & Mer.	53,258	47,245	I. 6,013	12.7
V. Shire. & P.	59,091	42,207	I. 17,484	41.4
Chic. & W. Mich.	84,347	83,834	I. 513	0.6
Cleve. & Canton.	27,465	20,830	I. 6,635	31.8
Det., Lan. & No.	74,417	72,847	I. 1,590	2.1
Des M. & Ft. D.	27,394	19,394	I. 8,000	41.2
Dub. & Sioux City	67,084	48,914	I. 18,170	37.1
Hous. & Tex. C.	218,584	207,918	I. 10,666	5.1
Iowa F. & S. City	44,567	26,988	I. 17,579	65.1
Lake Erie & W.	107,354	87,754	I. 19,600	22.3
L. Nash. & C.	137,370	113,730	I. 23,640	20.8
Marq. R. & Ont.	27,408	21,519	I. 5,887	27.3
Mexican National.	139,328	122,233	I. 17,095	13.9
N. C. Ft. S. & G.	211,666	163,403	I. 48,263	29.5
K. C. Spr. & M.	107,433	84,746	I. 22,687	26.8
Northern Central.	514,947	400,123	I. 114,824	28.6
N. Y. Sus. & W.	84,596	81,650	I. 2,946	3.6
N. Y. L. E. & W.	1,358,361	1,254,112	I. 104,249	8.3
N. Y. P. & O.	1,705,069	1,531,003	I. 173,466	11.3
Pennsylvania.	3,851,771	3,421,536	I. 430,235	12.5
Phila. & Erie.	102,143	67,137	I. 35,006	52.1
C. & M. P. M. & O.	371,701	339,761	I. 31,940	9.4
Texas Pacific.	547,512	429,370	I. 118,142	27.5
Tol. A. A. & N. M.	32,541	23,507	I. 9,034	38.1
West Jersey.	76,827	68,494	I. 8,333	12.1
Wab. St. L. & P. (East)	432,530	414,880	I. 17,650	4.2
Total	\$11,106,196	\$9,064,333	I. \$2,041,863	15.5
Month of December:				
	1886.	1885.	Inc. or Dec.	P. c.
L. R., M. R. & T.	\$54,220	\$50,222	I. 3,998	7.9
Lou. & Mo. R.	46,597	43,453	I. 3,144	7.2
Minn. & St. L.	149,184	130,488	I. 18,696	14.3
Total	\$250,001	\$224,163	I. \$25,838	11.5

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Cut Rates Agreement.

A satisfactory settlement has been made between the Chicago & Alton, Wabash, St. Louis & Pacific, and Illinois Central roads regarding the Lake Erie & Western coupons used by the scalpers to cut the through rates over the Chicago & Alton between Chicago and St. Louis. It has been agreed that the coupons shall be receivable on the Wabash, St. Louis & Pacific and the Illinois Central, as well as the Chicago & Alton. The Wabash, St. Louis & Pacific and the Illinois Central are to be paid by the Chicago & Alton for whatever proportion may be used. This will prevent interference with establishing through rates.

Central Traffic Association.

The General Passenger Agents of the various roads in the Central Traffic Association held a meeting yesterday at the office of Assistant-Commissioner Daniels for the purpose of formulating rules for the government of the passenger traffic under the Inter-state Commerce law. The rules recently formulated by the Southwestern Passenger Association were taken up for consideration, with the view of applying them, as far as possible, to the Eastern passenger traffic. The meeting came substantially to the same conclusions as reached by the Southwestern Association. The law was reviewed in all its bearings upon the passenger traffic, and joint questions and answers were prepared to be submitted to the Joint Committee of Managers in New York, March 3.

Action Under Inter-state Commerce Law.

A joint meeting of the managers of the railroads between Chicago and the Pacific Coast was held at Chicago, on Feb. 24 and 25, to consider the Inter-state Commerce Law. At the first day's meeting a committee, consisting of two members of every railroad association between Chicago and the Pacific coast, was appointed, to prepare a recommendation as to the action necessary to make the tariffs, etc., conform to the new law. At the meeting on the 25th inst., the special committee reported the following, which was unanimously adopted:

Whereas, The committee composed of representatives of the various traffic associations operating in the territory west, northwest and southwest of Chicago and St. Louis was

appointed to formulate a recommendation as to uniform methods as to transportation in conformity with the Inter-state Commerce Law; and

Whereas, The committee after a free interchange of views, while not fully agreed as to the strict interpretation of the law, are unanimously of opinion that earnest efforts should be made to comply with its several requirements in good faith: therefore

Resolved, That we recommend that the various railroads meet either in sections or in the associations with which they are connected, for the purpose of correcting their tariffs and methods in conformity with the requirements of the law, to the end that the commerce of the country shall be conducted in a manner conducive to the public interest and the preservation of railway revenues.

Cotton.

Cotton movement for the week ending Feb. 25 is reported as below, in bales:

	1887.	1886.	Inc. or Dec.	P. c.
Receipts.....	42,934	49,677	D. 6,743	13.5
Shipments.....	61,101	55,241	I. 5,860	14.2
Stock, Feb. 25.....	301,199	442,606	D. 141,407	31.9
Seaports:				
Receipts.....	95,013	92,867	I. 2,146	2.3
Exports.....	84,830	95,150	D. 10,320	10.8
Stock, Feb. 25.....	867,301	1,025,290	D. 161,989	15.7

The total movement from plantations for the crop year to Feb. 25 was 5,806,593 bales, against 5,684,802 last year, 5,175,779 in 1884-85, and 5,112,998 in 1883-84.

Coal.

Coal tonnages for the week ending Feb. 26 are reported as follows:

	1887.	1886.	Inc. or Dec.	P. c.
Anthracite.....	692,866	627,107	I. 65,759	10.4
Eastern bituminous.	275,545	263,404	I. 12,141	8.7
Coke (Feb. 19).....	86,942	25,670	I. 61,272	238.6

Cumberland coal shipments for the week ending Feb. 26 were 62,678 tons; total to Feb. 26 this year, 423,452; an increase of 119,833 tons, as compared with the corresponding period last year.

The coal tonnage of the Pennsylvania Railroad for the week ending Feb. 19 was:

	Coal.	Coke.	Total.	1886.
Line of road.....	157,797	85,876	243,673	204,371
From other lines..	84,232	1,066	85,298	100,721
Total.....	241,989	86,942	328,931	305,092
Year to Feb. 19....	1,778,188	628,013	2,406,201	1,964,671

Increase for the week, 23,839 tons, or 7.8 per cent.; increase for the year, 441,530 tons, or 22.4 per cent.

Still Fixing Fares and Freight Rates.

The committee organized on Feb. 19 to formulate, if possible, a classification applicable to east and west-bound freight traffic, has been in almost constant session since that date. The committee is made up of the following gentlemen: F. H. Kingsbury, General Agent of the Pennsylvania; R. L. Crawford, General Eastern Freight Agent of the New York Central & Hudson River; John T. R. McKay, General Freight Agent of the Lake Shore & Michigan Southern; George G. Cochran, General Freight Agent of the New York, Pennsylvania & Ohio, representing also the Erie Road, C. S. Wright, Assistant General Freight Agent of the Baltimore & Ohio; W. S. Sloan, General Freight Agent of the Delaware, Lackawanna & Western. Freight Commissioner N. Guilford was Chairman, assisted by Pool General Inspector R. G. Stevenson.

On March 2 the freight officers met at Commissioner Fink's office in New York to receive the report of the classification committee. Among the representatives of the great corporations present were Vice-Presidents Samuel Spencer and Orland Smith; F. Harriott, General Freight Agent; C. S. Wright, Assistant General Freight Agent, and C. K. Lord, General Passenger Agent of the Baltimore & Ohio; L. J. Seargeant, Traffic Manager; T. Tandy, General Freight Agent, and William Edgar, General Passenger Agent of the Grand Trunk; Vice-President S. M. Felton, Jr., L. P. Farmer, General Passenger Agent; G. H. Vaillant, Freight Traffic Manager; G. W. Ristine, Assistant Freight Traffic Manager, and J. S. Hammond, General Freight Agent of the New York, Lake Erie & Western; Vice-President Horace J. Hayden, Henry Monett, General Passenger Agent, and E. Clark, Jr., General Freight Agent of the New York Central & Hudson River; D. Layng, General Manager; J. W. Musson, Traffic Manager; C. E. Lambert, General Passenger Agent, and Lucius Smith, Assistant General Freight Agent of the West Shore; G. B. Spriggs, General Freight Agent of the New York, Chicago & St. Louis; J. Lowrie Bell, General Traffic Manager, and C. G. Hancock, General Passenger Agent of the Philadelphia & Reading; B. A. Hegenan, Traffic Manager; W. S. Sloan, General Freight Agent; A. Fell, General Western Freight Agent, and W. F. Howell, General Passenger Agent of the Delaware, Lackawanna & Western; John Taylor, General Traffic Manager, and E. B. Byington, General Passenger Agent of the Lehigh Valley; Vice-President Frank Thomson, J. S. Wilson, General Freight Traffic Agent; F. H. Kingsbury, General Agent, and James R. Wood, General Passenger Agent of the Pennsylvania; E. A. Ford, General Passenger Agent of the Vandalia Line; John Newell, President and General Manager, and J. T. R. McKay, General Freight Agent of the Lake Shore & Michigan Southern; H. B. Ledyard, General Manager, and O. W. Ruggles, General Passenger Agent of the Michigan Central; M. Knight, General Freight Agent of the Wabash, St. Louis & Pacific; M. E. Ingalls, President of the Cincinnati, Indianapolis, St. Louis & Chicago; John Muir, Traffic Manager of the Chesapeake & Ohio; John Porteous, Through Freight Manager of the Central Vermont; H. C. Dietl, General Freight Agent of the Indiana, Bloomington & Western, and George L. Connor, General Passenger Agent of the Fall River Line.

The report submitted calls for several radical changes. All the existing classifications and sub-classifications it reduces to six main classes without subdivisions. This report was adopted by the general meeting without alteration.

After a recess the railroad men met again and committees were appointed to consider minor matters involved in the report. The Rate Committee, composed of Messrs. Spencer, of the Baltimore & Ohio; Sloan, of the Delaware, Lackawanna & Western; Hayden, of the New York Central & Hudson River; Gray, of the Pennsylvania; Newell, of the Lake Shore; Ingalls, of the Cincinnati, Indianapolis, St. Louis & Chicago; Felton, of the New York, Lake Erie & Western; Wilson, of the Pennsylvania; Seargeant, of the Grand Trunk; and Mills, of the Boston & Albany, reported the Chicago rate for the six classes as follows: First class, 75 cents; second class, 65 cents; third class, 50 cents; fourth class, 35 cents; fifth class, 30 cents; sixth class, 25 cents. These rates are the same for east-bound and west-bound shipments. They may possibly be altered before the law goes into effect, but railroad men do not expect to see any change before that time. Under the provisions of the Inter-state Commerce bill alterations in the tariffs require ten days' public notice before going into effect.

OLD AND NEW ROADS.

Alabama.—Bills have been introduced in the Legislature of this state to incorporate the Mobile & Dauphin Island, the Birmingham, Mobile & Navy Cove Harbor, the Tuscaloosa Railway & Improvement Co., the Sheffield & Atlantic and the Florence, Montgomery & Tuscaloosa railroad companies.

Albany & Susquehanna.—The statement for the quarter ending Dec. 31 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings.....	\$755,986	\$749,078	I. 6,908	0.9
Expenses.....	415,943	338,332	I. 77,611	22.0
Net earnings.....	\$340,043	\$410,696	D. \$70,653	18.8
Rentals and taxes.	230,665	251,603	D. 20,938	8.3
Surplus.....	\$109,378	\$159,093	D. \$49,715	31.2

Albemarle & Raleigh.—The first train was run over the road from Tarboro, N. C., to Nashville, Nash County, on March 1.

Alpena & Petosky.—Articles of incorporation have been prepared for this company by capitalists of Detroit, Alpena and Petosky, Mich. The new road will reach from Alpena to Petosky, crossing the central northern part of the southern peninsula from east to west, and opening up a large area of new country. The capital stock of the company is \$600,000. The company has asked the grant of 52,000 acres of swamp land adjacent to the proposed road.

Amoret & Southwestern.—Charter filed at Topeka, Kan. The proposed road is to run from Topeka southeast through the counties of Douglas, Osage, Franklin, Coffey, Anderson and Linn, in Kansas, to Amoret, Bates County, Mo., and thence easterly to the Mississippi River. Capital stock, \$5,000,000.

Annapolis & Baltimore Short Line.—President Cleveland has approved the act granting the right of way to this road across the government farm connected with the Naval Academy at Annapolis, Md.

Annapolis, Washington & Baltimore.—This company, formerly the Annapolis & Elkridge, has cut off its traffic arrangements with the Baltimore & Ohio between Baltimore and Annapolis, Md. A dispatch to the Baltimore Sun describes the sharp and decisive methods resorted to as follows: "When Conductor Albert Welch started out this morning in charge of the early train on the Annapolis, Washington & Baltimore Railroad, which connects with the Baltimore & Potomac at Odenton, a distance of 14½ miles, and with the Baltimore & Ohio at Annapolis Junction, 21 miles from here, he had orders to refuse all tickets issued by the Baltimore & Ohio stamped from to-day. The conductor carried out his orders to the letter. When the car attached to the Baltimore train was transferred to the Annapolis track this morning, Conductor Welch went through as usual collecting fares. There were about fifteen persons holding Baltimore & Ohio round-trips, all of which he refused to honor. When the passengers asked the reason, the conductor said it was the orders from the Annapolis office. Twelve of the passengers paid their fare, and two colored passengers with straight tickets (a man and woman) were put off at Patuxent Station, a short distance from the Junction. A lady passenger from Baltimore protested against paying additional toll, and it was said that she will employ Mr. M. Bannan and Mr. John F. Williams, who were passengers on the same train, to bring suit against the railroad for not receiving her round-trip ticket."

The differences between the Annapolis and Baltimore & Ohio roads are described by each side to the disadvantage of the opposing side. The trouble seems to have arisen over the distribution of the respective shares of the two roads of the tolls charged for through passengers.

Atchison, Topeka & Santa Fe.—Mr. Clarence H. Verner has sent another formal protest to the directors. He now makes objection to the acceptance by the company of the act recently passed by the Kansas Legislature, authorizing railroad companies in Kansas to buy, lease or construct lines outside of the state. He claims that the Atchison Company exists by virtue of a special charter granted by the Legislature of the Territory of Kansas, that his rights as a stockholder were acquired under that charter, and that inasmuch as the charter is practically between the state, the corporation and the stockholders, those rights cannot be abrogated by a legislative act. He objects also to the ratification by the director or stockholders of any contract, guarantee, lease or other undertaking not authorized by the charter of the company, and says that he will contest any illegal use of the credit and assets of the corporation.

The company has bought 43 acres of ground just north of Minneapolis, Kan., and will build a roundhouse there and make the point an end of the division. Men and teams are now at work grading east and west of the town.

Atlantic, Greenville & Western.—The contractors for the road from Atlanta to Greenville, Ga., 120 miles, are Susong & Rambough. Eighty miles have been graded and tracklaying is to begin soon.

Bells Gap.—The extension known as the Clearfield & Jefferson road will soon be graded for 30 additional miles through Clearfield and Jefferson counties, Pa. The road is designed to tap the coal fields at Punxsutawney, Jefferson County, Pa.

Birmingham, Georgia & Florida.—This company has purchased of the Tallahassee, Bainbridge & Western the old road-bed known as the Bainbridge, Cuthbert & Columbus road, and proposes to build a through line to be completed this year from Birmingham, Ala., to Tallahassee, Fla., via Opelika, Florence, Cuthbert and Bainbridge. Length of proposed line is about 260 miles.

Buffalo, New York & Philadelphia.—The statement for the quarter ending Dec. 31 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings.....	\$630,862	\$656,208	D. \$25,346	3.8
Expenses.....	590,615	478,507	I. 112,108	23.4
Net earnings.....	\$40,246	\$177,701	D. \$137,455	77.3
Other income.....	13,413	44,663	D. 31,250	69.9
Total.....	\$53,659	\$222,364	D. \$168,705	75.8
Charges.....	93,470	222,742	D. 129,272	58.0
Balance.....	\$39,811	\$378	D. \$39,433	....

* Deficit.

Buffalo, Rochester & Pittsburgh.—The dissenting stockholders of the defunct Rochester & Pittsburgh made a slight move last week, which seemed to meet with no result. Mr. Howard J. Forker, Receiver of the old company, with W. H. Olmstead and lawyer T. F. Haskell, of New York, took a trip over the road and served notices on the agents along the line to account for the property in their possession. It is stated in Rochester, N. Y., that the old company possesses no assets whatever, and that consequently it is useless to attempt to discover any by taking an inventory of its successor's property. The law firm of Haskell, Clark & Vanderpool is preparing papers to commence four suits on behalf of Receiver Forker, one

against Brown, Howard & Co., contractors, two against Walston H. Brown & Bros., and one against the directors of the Buffalo, Rochester & Pittsburgh. The suits against the contracting firms are designed to prove their alleged dishonest methods in building and manipulating railroads. The suit against the directors is based on their voting to issue stock at 20 cents on the dollar. The suits will be to recover about \$1,500,000.

Canadian Pacific.—The steamship line to be inaugurated by this company will start from Vancouver, on the Columbia River, in Washington Territory, and run to Japan and China ports. The three steamers chartered from the Cunard line, the Parthia, Batavia, and Abyssinia, will run monthly until new steamers are built. Everett Frazer, 124 Water street, is the New York agent, and Frazer & Co. are agents in Japan. The line will connect with the Peninsular and Oriental and the Messageries Maritimes lines in the East India trade.

A Montreal dispatch of March 2 to the New York Mail and Express says: Yesterday's mayoralty contest was really a fight between the Canadian Pacific and Grand Trunk railroad corporations and the election of Hon. J. J. C. Abbott was a victory for the Canadian Pacific.

Central Massachusetts.—A large force of men is at work between Barre Plains and Ware, Mass., grading the road between those points. It is expected that trains will be run between Boston and Ware before May 1. Two steam shovels and four construction trains are soon to be put on the road between Boston and Jeffersonville, to thoroughly repair that section.

Central Pacific.—A snow shed between Colfax and Blue Cañon, Cal., fell in on the night of Feb. 15, completely blocking the track, and the reports say, causing the derailment of a snow plow and eight engines. The line had already been seriously blocked by snow, so that the overland trains were delayed several days. The road was finally opened Feb. 17.

Chesapeake & Ohio Canal.—At the directors' meeting in Washington on March 4, the freight rates for the ensuing year will be fixed. A number of minor appointments will be made, and considerable attention will be given to the subject of the Potomac Flats, to which President Baughman expects to establish a valid claim. The canal company, he says, has possession already of a large portion of this property, and is the only claimant of the disputed ground which has any of it in actual possession.

Chicago, Fort Scott & Texas.—The survey is completed from Higginsville, Mo., south to the Johnson County line, and grading will begin at once. The road is under contract to be completed from Higginsville to Warrensburg, 22 miles, this year. From the latter place it is proposed to extend the line to Fort Scott, Kan.

Chicago, Milwaukee & St. Paul.—The contract for the Merrill extension from Merrill, Wis., to Tomahawk Lake, 53 miles, has been let to R. B. Langdon & Co., of St. Paul, Minn. Work will begin immediately and is to be finished within the year. The extension lies through Lincoln County, a large part of the way along the west bank of the Wisconsin River.

Chicago, Milwaukee & St. Paul and Chicago & Northwestern.—County Attorney Ward, at Cedar Rapids, Mich., has sued these companies for \$17,000 each for not complying with the Sweeney law. The law provides that foreign corporations must incorporate under the State laws or pay a fine of \$100 daily, after September 1, 1886, until such incorporation. Mr. Ward seeks to collect 175 days' fine.

Cincinnati & Richmond.—This new road will cross the Cincinnati, Washington & Baltimore under the tracks of the latter at a point between Madisonville and Oakley, O., and in order to do this an arch 180 ft. long is to be built under the road. This is considered a delicate operation, because no interruption in trains is permitted on the latter road. Piles have been driven into the earth to a great depth, and caps and stringers put on them, on which the rails now rest, and later on a temporary trestle will be built at a short distance from the present tracks on which trains will be run while the arch is being built. Engineer Crowell is in charge of construction.

Cleveland, Akron & Columbus.—Construction work is in progress on the Dresden branch extending from Killbuck to Dresden, O., 35 miles. The contractor for the first ten miles is William Duncan. Work on the entire branch will be in progress by April and be completed within a year.

Cleveland & Canton.—A meeting of stockholders who are opposed to the present management is to be held at Boston on March 5.

Colorado Midland.—As soon as the bridge is constructed across Ruxton Creek, Colo., a force will be put to work laying the track up Ute Pass and into South Pass as rapidly as possible. The company now has 200 new cars ready for service. The Hagerman tunnel has attained a depth of 1,000 ft., about one-half what it is to be when completed.

Columbia & Port Deposit.—After a suspension of through traffic for just one month, the first train was got over this road on Saturday last. The line is from Columbia, Pa., to Port Deposit, Md., 40 miles. On Jan. 26 it was obstructed by ice and the debris from the ice gorge, since which time a force has been engaged in clearing and repairing. It is estimated that the loss sustained by the company from the floods will aggregate \$100,000, which includes the loss of general traffic during the enforced idleness of the road. Fifteen miles of the track was covered with ice ranging from 5 to 20 ft. in thickness.

Connecticut Railroad Commission.—Gov. Lounsbury has nominated William O. Seymour, of Ridgefield, Conn., for Railroad Commissioner for 4 years from July 1, 1887, to succeed John W. Bacon, of Danbury, Conn., whose term expires.

Dallas & Waco.—The surveyors have located the line permanently as far as Italy, Tex., and will continue on to Milford, when further instruction as to the direction of the road will be given.

Delaware & Hudson Canal.—On March 1 the management of the freight and passenger traffic of the Pennsylvania Division, and the auditing of the revenue of the same, will be transferred and placed in charge of the officers of the Northern Railroad Department.

Delaware, Lackawanna & Western.—The coal trestle for this road at Cheektowaga, Erie County, N. Y., is to be situated between its main line and that of the New York, Lake Erie & Western, about two miles east of East Buffalo. The structures will begin very close to the Erie's Cheektowaga station and run westward 8,000 ft., making it a trestle over 1½ miles in length. The height of the trestle is 80 ft., and nearly 5,000,000 ft. of lumber will be required for its construction. Underneath the trestle there will be a tunnel in which to load cars. This will be 22 ft. wide with side walls of stone 6 ft. in thickness and 12 ft. high, and having a capacity of about 50 cars at a time. The estimated cost of

the trestle is \$200,000. Mr. William S. Grattan, of Buffalo, N. Y., is the contractor.

Denver, Memphis & Atlantic and Chicago, Kansas & Western.—There is a legal fight now being waged in Sedgewick county, Kan., over the issue of railroad bonds. On Feb. 3, last, an election was held to issue bonds for the first named road, and on Feb. 8 another election was held to issue bonds for the latter road. The first is a Missouri Pacific extension and the last belongs to the Atchison, Topeka & Santa Fe. At these elections two separate polling places were used in each instance, one at Fargo Springs and the other at Springfield, and now the question is which of these was the legal voting place of the township. If the Springfield votes are cast out, then the Denver, Memphis & Atlantic will get the issue of bonds, while if those at Fargo Springs are not counted the situation is reversed. Now the rival roads are interested in a war which promises to be long and costly.

Des Moines, Osceola & Southern.—This road was sold at Des Moines, Ia., on March 1, under mortgage, and was purchased for \$750,000 by a committee representing the bondholders, who united for that purpose. The majority of them live in New England, and they will proceed to reorganize the road as soon as the sale is consummated.

Duluth, South Shore & Atlantic.—The contract for 60 miles of the road extending from a point near Hurley, Wis., to the east branch of the Ontonagon River, has been let to Harrison & Green, of Milwaukee, Wis.

Stockholders of the roads have voted to consolidate the Mackinaw & Marquette and the Wisconsin, Sault Ste. Marie & Marquette with the Duluth, Superior & Michigan and the Sault Ste. Marie & Marquette under the name of the Duluth, South Shore & Atlantic. The Marquette, Houghton & Ontonagon will be leased by the consolidated company for 99 years.

Mr. R. J. Hervey, principal member of the syndicate which is building the road, states that the bridge across the Sault Ste. Marie will be open to all roads touching that point, and that the Brockville & Westport & Sault Ste. Marie Co., which has been recently chartered, will be the extension of the former road to the St. Lawrence River near Brockville, Ont.

Eastern.—A bill has been submitted to the Committee on Railroads in the Massachusetts Legislature, asking for authority to issue additional bonds to an amount not exceeding \$900,000, for the purpose of paying notes secured by mortgage of lands, and of paying the mortgage bonds of the Essex Railroad Co.

Flagstaff & Grand Canon.—Organized in Arizona to build a road from Flagstaff, Arizona, on the Atchison & Pacific, northwesterly to the Grand Cañon of the Colorado, a distance of about 60 miles.

Florence & Chicago.—Organized in Alabama to build a road from Florence to the Tennessee state line, 20 miles. Capital stock, \$500,000.

Hancock & Calumet.—This road has been reorganized in the interest of the Ives syndicate so that now all the copper roads of Northern Michigan are under the control of the Mineral Range Co. The same syndicate controls the Cincinnati, Hamilton & Dayton and the Dayton & Ironton. They talk of building an independent line to avoid the use of the Iron road.

Hartford & Connecticut Western.—The negotiations of Philadelphia persons to purchase \$1,200,000 of the stock of the above road will be closed on March 4. The plan of the buyers is to build a short line to the Poughkeepsie bridge from the road's Western terminus at Rhinecliff, N. Y., and also a line from Hartford up into Massachusetts.

Hastings, St. Paul & Cannon Falls.—This company has been organized at Hastings, Minn., to build a line from West St. Paul via Rich Valley to Hastings, and thence to Cannon Falls, a total length of 40 miles.

Jeannerette & Abbeville.—The citizens of Jeannerette and Abbeville, La., have organized a company to build a road between the two points, which are about 25 miles apart.

Kanawha & Ohio.—President Cleveland has approved the act authorizing this company to lay its track through U. S. lock and dam property in the Great Kanawha Valley, W. Va.

Kansas, Nebraska & Dakota.—The Enterprise Construction Co. commenced building this road in March, 1886, and on Dec. 10 had completed and put in operation 130.4 miles from Topeka south to Fort Scott, Kan. Since opening the engine mileage has been about 800 miles per day, four passenger trains daily at speed over 25 miles per hour. It is notable that since operation commenced there has not been a wheel off the track and not a bone broken by any accident. The Master of Transportation, to whom much of this credit is due, is H. M. Pickinger, Fort Scott, Kansas.

Kentucky Central.—It is said that no opposition is presented to the reorganization of the company, and that it will now go through with all possible haste. Mr. E. C. Baldwin has been substituted for Elliott H. Pendleton in the committee, with C. P. Huntington and George Bliss. For the \$6,600,000 first-mortgage bonds, \$7,000,000 new 100 year forms will be issued, dollar for dollar. Stock on which 10 per cent. has been paid will have to pay in \$2 more, and that which has not paid will have to pay \$14. This will furnish enough for the interest, and the mortgage will have the first lien on all the revenues.

Lake Shore & Michigan Southern.—A branch is being constructed from Hubbard, O., to Sharon and Sharpesville, Pa., about 10 miles, which will give the Lake Shore access to 15 furnaces and several rolling-mills and nail works.

The company will, it is said, appoint surgeons for the road at all important stations. This was the practice years ago, but none have been appointed of late.

Lehigh & Wilkesbarre Coal Co.—The shareholders at their annual meeting voted to issue new bonds to the amount of \$2,500,000 for the purpose of retiring some of the present indebtedness of the company.

Little Rock, Mississippi River & Texas.—The road, which was recently bought by Jay Gould at foreclosure sale, has been transferred to the St. Louis, Iron Mountain & Southern.

Maine Central.—The company will build a new bridge across Lake Umbagog, a pleasure resort in Maine. Work has begun. The bridge will consist of a 50 ft. iron span, the remainder being of earth, making the entire structure 630 ft. long.

Manhattan.—The property owners of the strip of land adjacent to the 116th street station of the 6th avenue elevated road have contributed money for the building of an elevator from the street to the station. The structure is so high that people do not like to ascend it by the stairway, and the scheme of hoisting them up is counted upon to increase the value of real estate in that locality. The railroad company has agreed to operate the elevator.

Corporation Counsel LaCombe has decided that the Mayor of New York can legally appoint Rapid Transit Commissioners to pass upon the application for branch lines of the elevated roads to the ferries, notwithstanding the protest just made by Charles P. Shaw, counsel for the New York Cable Co., charging that the Manhattan has no legal existence.

Massachusetts Railroad Commission.—The following circular has been sent to all Massachusetts railroad companies: "The Board desires to be informed if all the bridges on your road and branches are provided with guard rails or guard timbers. Please state whether you use either or both. If rails are used, describe the form and method of laying them, and how far from the abutments of the bridge they extend; if timbers, state the size, how fastened, and the distance from the rail."

Memphis, Trinidad & Pueblo.—Chartered in Kansas. The proposed road will begin at a point on the south line of Kansas, thence northward through the counties of Sumner, Harper, Barber, Kiowa, Ford, Finney and Hamilton to the west state line, and from there to the city of Pueblo, Col. Second, it will start from Concord, Ford county, running southwestward through the counties of Ford, Finney, Hamilton and Morton and from there to Trinidad, Col. Capital stock, \$18,000,000.

Mexican National.—There is likely to be a sharp railroad war over the two rival routes to Guadalajara, Mexico. The officials of the Mexican National and the Mexican Central have been discussing the question together. The National people intend to build to Guadalajara, and ask to be allowed to do the local traffic between there and the City of Mexico, leaving to the Central the foreign business, and urge that the local traffic is not enough to make profits for both companies. Whether an amicable arrangement between the companies can be made is not yet known, but that they will both build into the city of Guadalajara is quite certain. The government wants two railroads to that place for military reasons.

The statement for the quarter ending Dec. 31 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings.....	\$408,114	\$322,556	I. \$85,558	26.8
Expenses.....	352,740	293,958	I. 58,782	19.9
Net earnings.....	\$55,474	\$28,598	I. \$26,876	93.8

The showing is a good one, being an increase of 93.8 per cent. net.

Minnesota & Northwestern.—The contract for building the tunnel 20 miles east of Dubuque, Ia., on the Chicago Division, has been let to Shepard, Winston & Co. Length of tunnel is 2,450 ft. through solid rock. Work begins immediately, and contract calls for completion by Nov. 1, 1887.

Mississippi River.—Incorporation articles have been filed in Missouri. The proposed road starts at a point on the St. Louis, Iron Mountain & Southern near Bushberg, in Jefferson County, Mo., and runs in a southeasterly direction through the counties of Jefferson, Ste. Genevieve, Perry, Cape Girardeau, New Madrid, Stoddard and Dunklin to a point on the St. Francis River. Length of road, 185 miles. Capital stock, \$3,700,000.

Moosic Mountain & Carbondale.—This road, recently chartered at Harrisburg, Pa., is to be built in the interest of the New York, Lake Erie & Western, and when completed will become an important part of the system. Carbondale, Pa., is the northern point of the Lackawanna coal field, the mines there being owned by the Delaware & Hudson Canal Co. The Erie now has a road between Carbondale and Susquehanna, a distance of 38 miles, and known as the Jefferson branch. It also owns large coal tracts north of Carbondale. Scranton is 16 miles below Carbondale, and between the two places the Erie is without a connection. The charter of this new road authorizes the construction of a line from the southern terminus of Erie's Jefferson branch to Dunmore, a suburb of Scranton, to connect with the Erie & Wyoming. This gives connection to the New York, Lake Erie & Western from both east and west with Scranton and the Wyoming coal fields.

Nashville, Chattanooga & St. Louis.—The statement for six months ending Dec. 31 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings.....	\$1,319,969	\$1,107,369	I. \$212,600	19.2
Expenses.....	766,355	659,250	I. 107,105	16.2
Net earnings.....	\$553,614	\$448,059	I. \$105,555	23.5
Charges.....	361,163	366,969	I. 5,806	6.5
Surplus.....	\$192,451	\$81,090	I. \$111,361	100.4

Nashville, Chattanooga & Tennessee.—The Jasper branch is graded from Inman, Marion County, Tenn., northeastward to Whitwell and surveyed to Dunlap. The contract for construction is let to Wilbur Foster, Nashville, Tenn.

New Orleans, Vicksburg & Baton Rouge.—Messrs. Myers, Rutherford & Co., of New York, as stockholders of this company, are suing the American Railroad Improvement Co., and also Wm. H. Barham, Wm. M. Sertt, Amos H. Calef, and John T. Granger to recover \$6,720,000. The railroad recently secured a land grant of about 1,600,000 acres of land, and it is alleged that the Southern Pacific Railroad Company agreed to give the sum sued for to the New Orleans company for the transfer of this land grant after the road had been constructed from New Orleans to Shreveport, La. The defendants have interposed a demurrer to the complaint. It was argued in support of the demurrer that, as the action had not been instituted at the instance of the company, the plaintiffs could not maintain their action. Decision is reserved by Judge Donahue, of New York.

New Roads.—It is probable that a corporation will be formed to build a road from Anniston, Ala., to Columbus, Ga., via West Point, Ga., total distance of 105 miles. Between West Point and Anniston the road will follow the Chatahoochee River, a fine water power. Meetings have been held in Anniston by parties interested, and particulars are promised very soon.

A survey has been made for a road from Bethlehem, Pa., to Nazareth, a distance of 9 miles. It will make a bee line from Nazareth to Philadelphia, 63 miles. The present distance via the Pennsylvania is 116 miles.

New York & Boston Rapid Transit Co.—The old scheme of an air line road between New York and Boston is being ventilated again, and it is stated that surveyors are now going over what is to be the probable line. Wallingford, Conn., 14 miles from New Haven, is the scene of operations. There are a dozen men at work and it is believed they were sent out by the New York & Boston Rapid Transit Co. It is said that the company has a capital of \$40,000,000, English and American. Possibly the new management of the New York & New England road is interested in the project.

New York Central & Hudson River.—There is a report that a combination is being formed by which the road will get direct access to Cincinnati other than over the Cleveland, Columbus, Cincinnati & Indianapolis tracks, and that

a company has been formed to build a 90-mile road from Geneva, N. Y., to a point in northeastern Ohio, which shall make a connecting link to secure the desired object. The roads that would be controlled for this scheme would be the Cleveland, M. and Vernon & Columbus, and the Scioto Valley, or if this latter could not be secured, a few miles of new road would be built below Columbus, O., to Washington Court-house, and from there Cincinnati would be reached over the Cincinnati & Northeastern.

New York, Chicago & St. Louis.—Receiver Caldwell has filed a motion to strike from the files the application recently made by Augustus Ward, at Chicago, which charged that sums aggregating \$10,000,000 of the funds derived from the sale of the first and second mortgage bonds had been misappropriated by the officers, and asked that suit be instituted to recover it. The Receiver argues that the application should have been made at Cincinnati, where the main foreclosure suit is pending.

New York, Lake Erie & Western.—The company has leased the line of steamers running on Lake Erie between Buffalo, N. Y., and Toledo, O. The boats were operated by the Wabash, St. Louis & Pacific, but will now be put on the Union Steamship line, which is the lake route of the New York, Lake Erie & Western from Buffalo to Chicago.

The statement for four months, October to January inclusive is as follows:

	1886-87.	1885-86.	Inc. or Dec.	P. c.
Earnings.....	\$6,400,608	\$5,954,426	I. \$506,182	8.5
Expenses.....	4,238,475	3,854,604	I. 383,871	9.9
Net earnings.....	\$2,222,133	\$2,099,822	I. \$122,311	5.8

The above statement includes 68 per cent. of the earnings and the entire working expenses of the New York, Pennsylvania & Ohio.

New York & New England.—Mr. W. H. Stevenson is now engaged in engineering the plans of this road in Connecticut. An endeavor is being made to gain control of the New Haven & Derby road, which can be connected with the New England by a stretch of track running from Birmingham, Conn., to Sandy Hook, the latter a small station near Danbury. This built, access is obtained to the Sound at New Haven, as is now had at Bridgeport by the control of the Housatonic, recently secured. It is said that the short road from Birmingham will be built by a nominally independent company, though it will be none the less for that a part of the New York & New England system.

The statement for the quarter ending Dec. 31 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings.....	\$1,042,161	\$950,500	I. \$91,660	9.6
Expenses.....	661,890	581,429	I. 80,461	13.8
Net earnings.....	\$380,279	\$369,071	I. \$11,208	3.0
Other income.....	32,293	21,583	I. 10,710	49.6
Total.....	\$412,572	\$390,654	I. \$21,918	5.6
Charges.....	302,402	455,293	D. 152,891	33.5
Balance.....	\$110,170	\$44,639	I. \$174,808	...

* Deficit.

W. H. Stevenson appeared before the New Haven, Conn., city government this week. He stated that he represented the syndicate that wished to buy the New Haven & Derby road and extend it to Hawleyville, Conn., to connect with the New York & New England. Mr. Stevenson argued the great advantages that the city would reap under the proposed plan, claiming that New Haven would at once become a competitive point, and freights would be materially lowered. The late Division Superintendent of the New York, New Haven & Hartford went on to say: "The New England road, which I represent, controls the Housatonic, the New York & New England and some other roads not known about. They intend to make one of the greatest railroad combinations in the world, and New Haven can easily reap a benefit from this system if she sees fit."

The offer from the New York & New England party for the city's interest in the Derby road is \$175,000. J. B. Sargent, who is supposed to be acting for the New York, New Haven & Hartford, has offered \$200,000. But it is said that the New England syndicate will meet all bids made by other parties.

New York, New Haven & Hartford.—President Depew has recently settled for \$60,000 a suit brought over 10 years ago by the New England Granite Co. It grew out of the contracts for the construction of the grain elevators in 62d street, New York, there being a dispute as to the amounts due the granite company for this work. The railroad company was sued for \$80,000, and a train of cars on a switch in New Haven, Conn., was attached. At one time the railroad people ordered the sheriff to remove the attached cars from the tracks, and the cars were about to be hoisted into an adjoining field, when a bond was given for the release of the train. The time that has since elapsed increased the demands of the plaintiffs for interest and damages. A parallel suit brought by other persons in the New York courts being decided against the railroad company, a settlement in this case was effected.

New York, Ontario & Western.—The report for the quarter ending Dec. 31 is as follows:

	1896.	1885.	Inc. or Dec.	P. c.
Earnings.....	\$327,108	\$481,573	D. \$154,465	32.0
Expenses.....	271,605	385,458	D. 113,853	29.5
Net earnings.....	\$55,503	\$96,115	D. \$40,612	42.2

Interest, rentals and taxes were \$64,335 for the year. The balance shows a deficit of \$8,332.

New York, Rutland & Montreal.—The contract for the 10 miles of road which this company proposes to build between the Massachusetts state line and Lebanon Springs, N. Y., to connect with the Housatonic road, is to be let next month.

New York, Woodhaven & Rockaway Beach.—The control of the road has passed from J. N. Oakley to Austin Corbin, President of the Long Island, who has begun foreclosure proceedings with a view to its complete reorganization. The road has a capital stock of \$1,000,000 and a funded debt of \$1,780,213. It extends from Glendale Junction, L. I., to Rockaway Beach. Since the failure of the mammoth hotel at Rockaway, the company has never been able to meet its full fixed charges.

North Carolina.—Bills have been introduced in the Legislature of this state to incorporate the Wilmington & Sea Coast, the Kingston & Snow Hill, the Polk County, the Oxford & Clarksville, and the Northern & Southern Railroad Companies.

Northern Pacific & Atlantic.—Articles of incorporation have been filed at Albany, N. Y., for this company, which is to acquire the new line now building from Brockville, Ont., to Saint Ste. Marie, Mich., which line is to be extended from the St. Lawrence River, opposite Brockville, through New York state to a connection with the Boston, Hoosac Tunnel & Western. The latter road will form the Massachusetts link of the system which is to bring Boston 275 miles nearer to Duluth, Minn.

Ohio & Mississippi.—The war of express companies has started afresh in Cincinnati. The Adams Express Co. unloaded its wagons on March 1 into the car belonging to the Baltimore & Ohio. The railroad accommodated both companies. The Baltimore & Ohio has been doing the express business over this road for years. The present contract was made in 1884. President Barnard, of the Ohio & Mississippi, says that he recently made a proposition to the Baltimore & Ohio to terminate the old contract, which he had understood could be done at any time, and to form a new arrangement by which the Baltimore & Ohio should do the express business exclusively over his line. The proposition was rejected and then the Adams Co. made a bid to the Ohio & Mississippi that was accepted. And this is why the Adams people opened up their business with the road to-day. The Baltimore & Ohio have filed a petition for an injunction, and a temporary restraining order has been allowed them. The latter company claims that their contract with the Ohio & Mississippi cannot be terminated in the manner attempted, and that on the bearing of the matter in court they will be restored to their former privileges on the Ohio & Mississippi road.

The Baltimore & Ohio has applied to Judge Sage of the United States Court for an injunction restraining the Ohio & Mississippi from interfering with the transaction of the plaintiff's express business over the Ohio & Mississippi line, which was granted until the matter can be heard on the 11th instant. The injunction, however, was so modified by Judge Sage upon application of the Adams Express Company to-day that it shall in no way affect the arrangements between it and the Ohio & Mississippi, and the Adams Express will continue its business on the line.

Old Colony.—The new passenger station at Milton Mass., was burned this week. Loss, \$20,000.

Omaha & Southwestern.—Chartered at Topeka, Kan., and the intention is to build a standard gauge road from Washington, Washington County, Kan., through the counties of Washington, Clay, Cloud, Ottawa, Lincoln, Ellsworth, Saline, Barton, Pawnee, Edwards, Kiowa, Ford, Clarke, Meade, Seward, Stevens and Morton. The principal office will be at Omaha, Neb. Capital stock, \$3,000,000.

Panama.—The company has bought 80 locomotives in Belgium.

Pennsylvania.—The annual report which will be read to the stockholders on March 8, refers to the Interstate Commerce bill as follows: "Your company has favored the enactment of a proper law upon this subject which, while guarding the interests of the public, would afford to the railways the protection to which they are justly entitled in the conduct of their business. As this law abolishes the system of pooling which the railroad companies had generally adopted for the purpose of securing uniform rates to shippers and preventing destructive competition, and as it in other respects enforces new methods for conducting through transportation, it is difficult to anticipate what its effects may be either upon the railways or on the general interests of the country. Your management will strictly observe its provisions so far as they affect the traffic on your system."

Philadelphia & Reading.—The reorganization trustees met in Philadelphia on March 1, and received from Drexel & Co. and Brown Brothers & Co. reports of the deposits, at par value, of \$109,252,646 out of the aggregate of \$122,891,505 of stock and securities deposited with them under the plan of reorganization. These resolutions were then passed:

Whereas, Deposits of securities under the plan of reorganization have been made as follows:

	Total issues.	Deposits.
General mortgage bonds.....	\$4,686,000	\$24,200,000
Income bonds and convertible adjustment scrip.....	9,884,000	8,852,700
First series five.....	7,782,000	2,708,500
Second series five.....	6,922,000	6,384,450
Debtenture and guarantee scrip.....	557,500	424,550
Convertible bonds.....	5,516,800	5,427,075
Debtenture bonds railroad company.....	652,200	600,000
Debtenture bonds Coal and Iron Company.....	1,110,000	1,040,000
Common stock.....	39,477,347	37,111,640
Preferred stock.....	735,500	551,400
Preferred income bonds.....	25,508,090	21,698,100
Detached coupons.....	106,211	106,211
Total.....	\$122,891,506	\$109,252,646

Resolved, That this board recommend to the syndicate the propriety of extending the time for receiving deposits of securities under the plan of reorganization for 15 days from the 1st day of March, with a penalty of 1 per cent. on the face value of the securities, to be paid at the time of deposit, and also recommend an additional extension of 15 days, with a penalty of 2 per cent.

J. Lowber Welsh was requested to present this resolution to the syndicate for their action. The deposits made insure about \$12,000,000 being paid into the Philadelphia & Reading as assessments by its own stock and bondholders to secure reorganization. The plan carried out is considered a most successful one.

Mr. Joseph Wharton has agreed to take \$500,000 income bonds for \$500,000 convertible income scrip. Only \$200,000 of the scrip is now out. More than \$3,000,000 worth was out a year ago.

Pullman's Palace Car Co.—This company has won a suit against the Board of Assessors of the State of Louisiana. It was to enjoin the collection of the tax assessed upon Pullman cars run on the various roads doing business with New Orleans. Judge Pardee, in the Circuit Court, gave as his decision that the company, having no standing in Louisiana and the cars having no status, they being constantly in transit, the assessment upon them was not legal, and the tax could not be collected.

Rapid Transit Elevated Electric.—Preparations have been made at Los Angeles, Cal., for the incorporation of this company, the intention being to operate in San Diego, San Bernardino and Los Angeles counties. The capital stock is \$700,000.

Roadhouse & Quincy.—Incorporation articles have been filed at Springfield, Ill., and the proposed road will extend from Roadhouse, Green County, Ill., through Pike County and across the Mississippi River to Hannibal, Mo. Principal office is at Pana, Ill. Capital stock, \$500,000.

St. Louis & San Francisco.—The Fayetteville & Bowen branch in Arkansas has been opened for business, and freight and passenger trains are in daily service. The line is 25 miles long.

St. Paul, Minneapolis & Manitoba.—A dispatch from Fargo, Dak., states that three great railroad building firms have combined and taken the contract for building for the above-named company 700 miles of road between Mouse River in Northern Dakota and Great Falls in Montana. From Great Falls the line runs south to Helena as the Montana Central. It is claimed that the road will be operated from St. Paul, Minn., to Helena, Montana, before fall, and will have branches to Butte and other Montana points, and so compete with the Northern Pacific.

Ship Island, Ripley & Kentucky.—Grading is completed from Ripley, Miss., to Pontotoc, 36 miles. The southern terminus of the road is to be at Mississippi City, Miss., and the northern is to a connection with the Ohio Valley road now being built. Total length of line, 400 miles.

South Pacific Coast.—The road now extends from Port Hartford in San Luis Obispo County to Los Alamos in Santa Barbara County, and the line is about to be extended southward for a distance not yet decided upon. The surveying engineer, E. Y. Buchanan, is making preliminary surveys. Manager F. M. Fillmore has the matter in charge.

Southern Pacific.—The company is about to remove its tracks from Indianola, Tex., to Port Lavaca, a small village 12 miles above. Indianola is abandoned on account of the disastrous storms that have swept over the town during the past 12 years. In that time 400 persons have been drowned, and enormous damage has been done to property.

This company intends to run a spur track from Sepulveda Station, Los Angeles County, Cal., to a cañon three miles distant, to reach and develop a large quarry of marble and limestone.

Texas & Pacific.—The reorganization committee has effected a settlement with the income bondholders, by which the latter will get their original demand of 60 per cent. in new second mortgages, about 3,500 acres which are covered by land grant mortgages and land notes to the amount of \$1,000,000. The old proposition, which was rejected by the income bondholders, included only 40 per cent. in the new second mortgages and the lands and notes.

Troy & Boston.—A director of the company says that the interest due March 1 on bonds of the road will not be paid, and that the bondholders will be given an opportunity to foreclose and sell the road. A consolidation with the Fitchburg road has been effected so far as possible, until the controversy over the first and second mortgage bonds shall be ended. If the road is sold under default on interest bonds, the Fitchburg company is likely to be the highest bidder.

Union Pacific.—It is reported that the road is to have its western terminus at Portland, Ore., where car and machine shops will be built.

Union Station in Boston.—The directors of the Boston & Maine, the Eastern, the Boston & Lowell and the Fitchburg roads are considering two plans for the construction of a mammoth union station, to be used conjointly. It is an idea which is to be carried out very elaborately, if at all, for the cost of the structure proposed by either plan will be \$5,000,000. The design is to be similar to the Broad street station of the Pennsylvania road in Philadelphia. About 16 tracks will be run into the building, accommodating 200 passenger cars made up into trains. The question of the site is not fixed, but the structure will stand either where the Boston & Maine depot is now, on Haymarket square, or upon the site of the Boston & Lowell, on Causeway street.

Vicksburg, Shreveport & Pacific.—The contractors, Messrs. Rogers & Ballentine, have completed the work of raising the roadbed between Delta and Monroe, La. A large force has been at work for two years and have put up over 1,000,000 cubic yds. of earthwork. The track is now above the high water of 1882.

Virginia Western.—The Chief Engineer, with a corps of assistants, has begun the survey from Catawba, Roanoke County, Va., and will run it down Poverty Creek westward to New River, and thence to the Tennessee line. It is believed that this road is to take the Valley roadbed from Lexington, Va., and will run thereon within 15 miles of Salem, Va., thence up the Catawba Valley and on to the Tennessee line.

Wabash, St. Louis & Pacific.—George J. Bonner and others, representing \$500,000 of this company's bonds, have filed a petition at St. Louis, Mo., to direct the Receivers to pay over the interest for two years due on the bonds held by the petitioners, which, they claim, are secured by two mortgages, one issued in 1867 on that part of the road known as the "Main Line East and Branches," under which bonds were issued to the amount of \$2,610,000. The other mortgage is issued on that part of the road known as the Decatur & East St. Louis Division, to secure \$2,700,000 of bonds. The petitioners claim that interest has been due and unpaid for two years; that the Receivers have, in the meantime, realized about \$1,200,000 net cash from the divisions first mentioned and about \$437,000 from the other divisions, and that this has been applied toward paying the expenses of other divisions that ran to loss, instead of being used to pay off the interest on the bonds. And now it is asked that the net income of these two divisions be paid over to the bondholder creditors under these two mortgages.

The Purchasing Committee are in St. Louis, and on Feb. 28 appeared before Judge Brewer for the purpose of stating their intention in regard to the order of the U. S. Court of the Eastern District of Missouri requiring them to pay down \$1,000,000 and to give a bond in \$1,000,000 as the condition of completing their title to and taking possession of the road. Representatives of the bondholders who filed the intervening petition on Saturday last were also present, and asked that their claims should be settled before possession of the road be given to the Purchasing Committee. Gen. Thomas H. Hubbard, of the Committee, stated that in view of the intervening petition and the action which the Court might take on it, the Committee were ready to pay down the \$1,000,000, but before giving bond would like to have the petition settled. Judge Brewer made an order requiring the Committee to pay down forthwith, either in cash or Receivers' certificates, the \$1,000,000, and giving an extension of time in which to file the bond for \$1,000,000 until Monday, March 7. The case will come up at that time before Judges Brewer and Thayer. The committee has made its payment of \$1,000,000 to the Registry of the U. S. Court in St. Louis. The payment consisted of \$847,579 in Receivers' certificates, with interest to date, one check for \$106,932, and another for \$45,489. The checks were on the Mercantile Trust Co., of New York, and signed by all the members of the committee.

Wabash, St. Louis & Western.—The articles of incorporation of this successor of the Wabash, St. Louis & Pacific Co. have been sent to the Secretary of State's Office at Jefferson City, Mo. The share capital of the new company is fixed at \$6,000,000.

West Jersey.—Work is to soon begin upon an extension of the Bridgeton branch from the present station in Bridgeton, N. J., down into the business part of the town for 1½ miles. A new passenger station will be built.

Surveys have been completed for a branch line from Manumusk, on the main line, to tide-water on the Maurice River, near Port Norris, N. J. Length of line, 10 miles. Construction work is to begin at once.

Williamstown & North Adams.—The Committee on Railroads of the Massachusetts Legislature gave a hearing on March 2 on the petition to revive the charter of this road. Vice-President Smith, of the Boston, Hoosac Tunnel & Western, said it was proposed to spend from \$2,000,000 to \$4,000,000 to open the road in Massachusetts as part of a through line in contemplation from Rotterdam Junction to Duluth, Minn., through Canada, to avoid competition with

the New York companies, and bring Boston 300 miles nearer Duluth.

Willmar & Sioux Falls.—The surveyors are at work in the northern part of Pipestone County, Minn., on their way to Sioux Falls.

Yankton, Sioux Falls & Nebraska.—Organized at Yankton, Dak., to build a road from Sioux Falls southwestward to Yankton, about 60 miles.

ANNUAL REPORTS.

Lake Shore & Michigan Southern.

This company owns a line from Buffalo, N. Y., to Chicago, Ill., 540.49 miles, with branches of 324.38 miles. Its proprietary roads and leased lines aggregate 475.48, a total of 1,340.35 miles. The statement is for the year ending Dec. 31. The earnings for the year were as follows:

	1886.	1885.	Inc. or D. c.	P. c.
Earnings.....	\$15,859,452	\$14,133,506	I. \$1,725,946	12.2
Expenses.....	9,374,674	9,287,537	I. 87,137	0.9
Net earnings.....	\$6,484,778	\$4,845,969	I. \$1,638,809	32.8
Gross earn. p. mile.	11.835	10.545	I. 1.290	12.2
Net " " " " " "	4.838	3.615	I. 1.223	33.8
Per cent. of exps.	58.1	65.7	D. 7.6	

Other income for the year was \$100,750; total, \$6,585,528. The charges were \$4,180,676, leaving the surplus for the year \$2,404,852. Contribution to sinking fund, \$250,000; dividends paid, \$989,330; balance for the year, \$1,165,522.

Pennsylvania Railroad.

The annual report of this company for 1886 is given here nearly in full. Some analysis of it will be found in another column:

MAIN LINE BRANCHES, PHILADELPHIA TO PITTSBURGH.

Earnings.....	\$31,132,267.14
Expenses.....	19,149,249.86

Net earnings.....\$11,983,037.28
Add interest from investments (in cash), also for use of equipment and from other items.....4,459,417.61

Total.....\$16,442,454.92

Deduct rentals paid branch roads, interest on equipment, interest on bonded debt, state tax on dividends and other items.....7,467,485.14

Net income Pennsylvania Railroad Division.....\$8,974,969.78
Increase over 1885.....821,284.00

PHILADELPHIA TO NEW YORK AND BRANCHES.

Earnings.....	\$15,538,304.09
Expenses.....	11,227,812.84

Net earnings from operating.....\$4,310,492.15
Add interest from investments.....401,025.08

Total income.....\$4,711,517.23

Deduct payments on account of dividends, interest on equipment, etc. 4,890,533.02

Net loss under the lease of United New Jersey Railroad and Canal Company's property.....179,015.79

Balance.....\$8,795,953.99
Increase of net loss, N. J. Division, over 1885.....19,519.00

PHILADELPHIA & ERIE RAILROAD.

Earnings.....	\$3,708,484.87
Expenses.....	2,242,531.91

Net earnings.....\$1,465,952.96
Deduct interest charged for use of equipment, etc.....201,695.90

Net earnings payable to Philadelphia & Erie Railroad Company as rental.....\$1,264,257.06
Increase over 1885.....165,270.00

SUMMARY.

Net income Pennsylvania Railroad Division.....	\$8,974,969.78
Net loss New Jersey Division.....	179,015.79

Balance after deducting loss on New Jersey Division.....\$8,795,953.99

From this balance of income for the year.....8,795,953.99

the following amounts have been deducted:

Payment to fund for the purchase of securities guaranteed by the Pennsylvania Railroad Company.....\$69,895.53

Pennsylvania Railroad Company's consolidated mortgage bonds, sinking fund account.....324,800.00

Allegheny Valley Railroad Company.....668,390.00

Deficiency in meeting interest guaranteed by Pennsylvania Railroad Company.....15,000.00

Frederick & Pennsylvania Line Railroad Company.....90,000.00

Amount paid in settlement of balances under Trunk Line pool in 1886.....411,971.56

Payment made in 1886 on account of liability for the destruction of private property by fire in New Brunswick, N. J.....265,000.00

1,875,057.09

Out of which was paid a dividend of 5 per cent.\$692,806.90

4,738,892.50

Leaving a balance of.....\$2,182,004.40

From which should be deducted the following:

Balance of the amount advanced to the Pennsylvania Company in 1885, to enable it to meet its obligations to its leased lines, and for other purposes.....\$967,093.06

Balance in settlement of sundry accounts and amount charged off for depreciation.....623,755.84

1,200,848.90

Total amount transferred to profit and loss for the year 1886.....\$891,155.50

Add amount to credit of profit and loss Dec. 31, 1886.....14,734,102.85

Balance to credit of profit and loss Dec. 31, 1886.....\$15,625,348.53

The preceding statements show a gratifying increase in the gross revenue of the company, and notwithstanding the prevailing low rates, the increased expenditures rendered necessary by the enforced economies of the previous year, and a reduction in the income from investments, there is a reasonable increase in the net revenue.

The net results of the lines east of Pittsburgh and Erie

were \$8,795,953.99; after deducting the sums properly chargeable thereto, and the payment of a dividend of five per cent., there remained a balance of \$2,182,004.40, from which was deducted the sum of \$1,290,848.90, properly chargeable to profit and loss, leaving \$891,155.50, to be carried to the credit of that account. This sum, which is less than one per cent. on the capital stock of the company, represents the amount of profits expended during the year in strengthening and improving your properties, and which, on the basis of a strict division between expenses and capital expenditures, might also have been distributed among the shareholders. But it will hardly be contended that, with the serious responsibility resting upon your company for the leases and obligations of many other large corporations, all of which are subject to the violent fluctuations incident to transportation interests in this country, this amount is greater than should have been thus permanently invested out of your current revenues.

The charge of \$1,667,732.64 to your profit and loss account during the years 1885 and 1886, being the amount advanced to the Pennsylvania Company to meet the deficit occurring in 1885 in the operation of your Western lines, and for other purposes, was properly made, in view of the fact that your company is responsible for all liabilities connected with these lines, and such sum could not be returned to your treasury, unless that company increased its obligations by borrowing this amount; and, while there is a fair balance to the credit of its profit and loss account, it does not consist of cash, but of property unavailable for such purpose, and necessarily held to protect its interests. After crediting its profit and loss account with the sum above stated, it will be seen, by reference thereto, that it was necessary for that company to charge against that item \$1,065,000, the cost of the Equipment and Construction bonds of the Pittsburgh, Fort Wayne & Chicago Railroad Company, which it paid under the terms of the lease of that road, and for which it receives no securities, and also an additional amount, being a portion of the depreciation in the value of the Jeffersonville, Madison & Indianapolis railroad stock resulting from the construction of competitive lines.

It will be noted that the freight rates show a slight improvement on all divisions east of Pittsburgh and Erie, but that on the United Railroads of New Jersey Division the increased expenses more than offset the additional revenue. There was an increased movement of both passengers and tonnage, and while there was a slight decrease in the through freight on both the Main Line and the United Railroads of New Jersey, there was a large gain in the local tonnage of all the lines. Upon your main line nearly ninety-two per cent. of the tonnage was made up of local freight.

The Philadelphia & Erie Railroad Division shows an improvement in net results, and was more than able to provide for all its fixed charges.

The loss to your company upon the United Railroads of New Jersey slightly exceeded that of last year. The exceptional service required upon that division, in connection with the expensive character of its terminals, seems to preclude the possibility of operating it as economically as the other roads in your system.

There has been expended for construction, equipment and real estate as follows:

Pennsylvania Railroad and branches.....\$1,890,318.40

United Railroads of New Jersey.....468,163.53

Philadelphia & Trenton Railroad.....117,553.19

And for improvements and extensions on branch and auxiliary lines operated by the Company.....511,352.52

*Advances on account of construction of new branch and auxiliary lines.....2,436,591.06

Total.....\$5,423,978.70

On account of the advances there has been received from some of the companies in cash.....447,694.50

Total amount expended on capital account in 1886.....\$4,980,284.20

This amount was obtained by the issue of 74,869 shares of stock.....\$3,743,450.00

From the surplus profits of the company.....891,155.50

From miscellaneous resources.....345,678.70

Total.....\$4,980,284.20

* On account of these advances to branch and auxiliary lines there have been received in securities of those companies, \$1,943,800.54.

The principal of the debt due to the state of Pennsylvania on account of the purchase of the Main Line was reduced during the year by the payment of \$347,800.25, which was charged to capital account. The balance due on this account is \$1,982,071.47.

Under the provisions of the consolidated mortgage of the company there were set apart, on the first day of July last, out of the net income, \$324,800 as a sinking fund for the redemption of the outstanding bonds secured by that mortgage.

Their market value was too high, however, to permit of the purchase of any of these securities. The amount was placed to the credit of the trustees of the sinking fund, making an aggregate of \$647,630 placed with them for investment; and they have been able to invest a portion thereof in well-secured first mortgages upon real estate bearing four per cent. interest per annum. The amount of bonds purchased to date is \$1,769,070 at their par value, being the same as reported last year. These sums, with the accrued interest thereon, amounting to \$11,165, make a total in the sinking fund, Jan. 1, 1887, of \$2,427,865.

There are now in the sinking fund, for the redemption of the obligations of the various companies forming the United New Jersey Railroad & Canal Company, securities of the par value of \$4,055,900. There is also a cash balance, uninvested by the trustees, of \$3,934.55, making an aggregate investment of \$4,059,834.55, for which you will in the future, in accordance with the terms of the lease, receive bonds to be issued under the general mortgage of that company.

The trustees of the sinking fund for the redemption of the trust certificates issued for the purchase of the shares of the capital stock of the Philadelphia, Wilmington & Baltimore Railroad Co. were able to purchase but \$192,000 of such certificates during the past year, at the limit fixed in the trust agreement, and therefore returned to your treasury \$216,392.39 of the amount appropriated for that purpose. The general account of the treasurer shows a reduction in the amount of outstanding certificates equivalent to the certificates redeemed. The total amount of these certificates purchased and canceled to Dec. 31, 1886, is \$1,826,000, leaving outstanding \$8,174,000.

Further provision was made under the system of Car Trusts, for the equipment of your roads, by the issue of \$5,000,000 additional certificates, bearing interest at four per cent. per annum. Under this arrangement there had been furnished, up to the close of the year, 2,805 long and hopper gondolas for the main line, 750 box cars and 1,200 long gondolas for the lines in which your company is interested west of Pittsburgh, and 81 long gondolas, subleased to the Northern Central Railway Co.

The outstanding certificates of Series E of the Car Trust of Pennsylvania, representing 1,000 box cars at a cost of \$420,000, and bearing interest at 6 per cent. per annum, were paid and canceled during the year. The cars thus furnished had been sublet to the Pittsburgh, Cincinnati & St.

Louis Railway Co., and have been paid for and are now owned by that company.

The 20,614 cars placed on the lines east of Pittsburgh, through the system of car trusts, represent a cost of.....\$10,843,380

The 12,937 cars west of Pittsburgh.....6,499,370

The cars subleased to affiliated lines, viz.:

2,031 cars Northern Central Railway Company.....\$1,056,750

250 cars Allegheny Valley Railroad Company.....137,500

152 cars New York, Philadelphia & Norfolk Railroad Company.....100,000

1,294,230

Total, 35,984 cars.....\$18,637,000

Total amount of certificates redeemed to Dec. 31, 1886, is as follows:

Amount paid in full payment of 10,214 cars.....\$5,454,000

Amount paid on account of 25,770 cars.....5,393,000

10,847,000

Balance of certificates outstanding Dec. 31, 1886, \$7,790,000

COMPARISONS WITH 1885.

EARNINGS AND EXPENSES OF ALL LINES EAST OF PITTSBURGH AND ERIE.

	Gross earnings.	Expenses.	Rental and interest on equipment.	Net earnings.
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1886.....\$50,379,077.0

1885.....45,615,453.55

Inc. \$4,764,434.45

\$3,619,594.01

\$2,453,745.87

\$4,194,713.06

\$3,139,829.77

\$359,032.81

\$1,265,180.57

The gross earnings per mile received from the Main Line (358 miles) in 1886 were.....\$68,064.25

In 1885 were.....59,625.27

Showing an increase of.....\$8,458.98

The following tables show the revenue and cost per mile on each division operated by the company, in cents:

Main Line and Branches. United Railroads of New Jersey. Phila. & Erie R. R. All lines east of Pittsburgh and Erie.

Freight.

Length of road (miles).....1568.22 465.99 287.56 2,321.77

Average earnings per ton per mile from transportation of freight.....0.695 1.327 0.523 0.755

Average cost of transporting each ton of freight one mile.....0.423 1.066 0.310 0.492

Average profit per ton per mile.....0.272 0.261 0.213 0.263

From the above table it will appear that the average rate per ton per mile in 1886 on the Main Line and branches shows an increase when compared with 1885 of 68-100 of a mill, and the cost of transportation per ton per mile an increase of 32-100 of a mill, showing an increase of 36-100 of a mill in the profit per ton per mile.

The rate received on the United Railroads of New Jersey Division shows an increase of 78-100 of a mill, and the cost of moving an increase of 9-10 of a mill, showing a decreased profit of 12-100 of a mill.

On the Philadelphia & Erie Railroad the earnings show an increase of 25-100 of a mill, and the cost of movement an increase of 3-100 of a mill, making an increase in the profit of 22-100 of a mill.

The result upon all lines east of Pittsburgh and Erie was an increase of 28-100 of a mill per ton per mile in the net profit from freight.

The following table shows the earnings and cost per passenger per mile on each of the divisions, in cents:

Main Line and Branches. United Railroads of New Jersey. Phila. & Erie Railroad. All lines east of Pitts. & Erie.

Passenger.

Length of road (miles).....1,568.22 465.99 287.56 2,321.77

Average earnings from each passenger per mile.....2.245 1.957 2.624 2.114

Average cost of transporting each passenger one mile.....1.797 1.410 2.046 1.611

Average profit per passenger per mile.....0.448 0.547 0.578 0.503

The number of tons of freight moved over the Main Line and branches, not including 1,443,904 tons of fuel and other material for company's use, was 26,420,948 tons; for the previous year, 24,047,028 tons; showing an increase of 2,373,920 tons, or 9.87 per cent. The through freight decreased 78,708 tons, while the local freight increased 2,452,628 tons.

Of the 26,420,948 tons of individual freight transported over the Main Line and branches 2,178,472 tons, or 8.25 per cent., were through, and 24,242,476 tons, or 91.75 per cent., were local freight.

The aggregate coal and coke shipments amounted to 15,359,606 tons, as against 14,291,909 tons in 1885—a gain of 1,077,697 tons.

The total shipments of oil during the year 1886 amounted to 3,048,484 barrels, against 3,446,303 barrels in 1885, showing a decrease of 397,819 barrels.

On the Main Line the through freight east-bound decreased 8.58 per cent., while west-bound it increased 11.49 per cent. The local freight shows an increase of 5.12 per cent. eastward and 22.30 per cent. westward.

The number of passengers carried on the Main Line and branches shows an increase of 1,819,476, or 14.74 per cent.

On the United Railroads of New Jersey there was a decrease in through freight of 87,866 tons, and an increase in local freight of 489,431 tons, making a total increase of 401,565 tons, or 4.90 per cent. The passenger traffic shows an increase of 1,563,695 in the number carried, or 10.94 per cent.

On the Philadelphia & Erie Railroad there was an increase of through and local freight in both directions: the through having increased 110,072 tons, and the local 466,557 tons—a total increase of 576,629 tons, or 10.25 per cent. There were 65,082 more passengers carried in 1886 than in 1885, an increase of 6.44 per cent.

There were built at Altoona, and your other shops east of Pittsburgh and Erie, for the Main Line and other roads in your interest, 124 locomotives, 106 passenger cars, 2 baggage cars, 4,066 freight cars, and 168 cabin and maintenance of way cars.

There were used on the Main Line, in construction and repairs, 19,418 tons of steel rails, and 893,238 ties; on the United Railroads of New Jersey, 6,183 tons of steel and 335,553 ties; and on the Philadelphia & Erie Railroad, 2,100 tons of steel and 133,358 ties—making a total of 27,701 tons of steel and 1,352,149 ties.

The following tables show the gross earnings, expenses and

